THE IRON TRADE REVIEW

VOLUME XXVII. CLEVELAND, O. MAY 3, 1894. CHICAGO, ILL. NUMBER 18.

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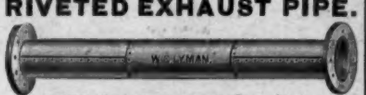

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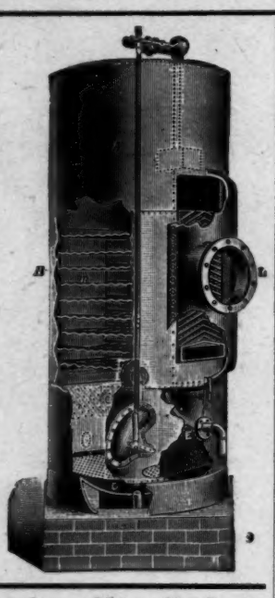

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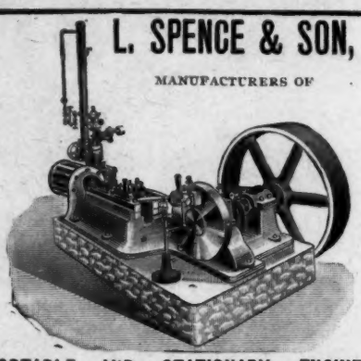

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THE IRON TRADE REVIEW

VOLUME XXVII. CLEVELAND, O. MAY 3, 1894. CHICAGO, ILL. NUMBER 18.

THE WEEK IN IRON CIRCLES.

GENERAL FEATURES.

The coal strike has been the dominant factor in the iron trade of the past week and every day brings added constriction in all departments. The Bessemer pig and billet markets have come to a standstill within the past three days. Neither material is to be had for prompt delivery, and buyers see little to be gained in making contracts for the future, subject to the strike clause, at the figures which producers quote. Few sellers, moreover, are willing to tie themselves up to contracts running three or four months ahead, with prices rising, and are disposed to wait until some of the uncertainties of the present situation have been eliminated before committing themselves. The situation is thus perforce a waiting one. Old heads in the trade, who have learned better than to make predictions, simply say that there is no market for Bessemer iron or for steel at present, and that the future depends on the solution of the fuel problem, but there goes with all such statements the intimation that the basis has long been unreasonably low and that a very little buying movement was needed to work a change for the better. Here and there the belief is expressed by men who can't resist forecasts, that Bessemer iron is not likely to go below $11 at Pittsburg after present complications have gone by. Within the past week, before transactions had ceased, a few sales were made at Pittsburg on a basis of $11. Since that time offers of $10.50 and later of $10.75 at valley furnace are reported to have been made. In billets, in the early portion of the present market week $17, Pittsburg, is reported to have been paid on spot lots. The banking of blast furnaces dependent on Connellsville coke has gone on until but one is active in the valleys and none in the Pittsburg district save those in the Carnegie group at Braddock that have a several weeks' supply of coke piled up near them. Steel works and rolling mills also feel the fuel scarcity and a number of Western producers of finshed material have been compelled to suspend operations. Yet the working up of iron and steel into finished material is not yet restricted in proportion to the reduction of blast furnace output, so that the net result of the fuel trouble thus far is an inroad upon stocks of Bessemer iron. In foundry iron there is no change discernible as yet, though the fact that when resumption comes furnaces heretofore on foundry will turn to making Bessemer, has lessened the demoralization a trifle. Southern sellers are not disposed to sell heavily for forward deliveries, sharing the general conviction that the low level of the past few months cannot continue. Strikes and labor demonstrations have added to the feeling that the beggarly prices of the past half year, both for manufacturer and wage-earner, must see a change. Finished material demand is not distinctly changed in the week. Some fair orders for rails are reported in the West. In sheet iron and steel a better feeling prevails and Western mills find in increased inquiries from jobbers and the fact that roofers are doing better business, proof that prices have seen their lowest.

THE CLEVELAND OUTLOOK.

Stocks of iron ore on Lake Erie docks on May 1, as shown by tables printed elsewhere, were 2,588,370 gross tons, or in round numbers about half a million tons more than on the same date last year. The large stocks of non-Bessemer thus shown to be already down, added to the lessening use of finished iron, explain the inaction of the non-Bessemer ore market. As to Bessemers the feeling is general that furnacemen early in the market did well, since producers of some of the standard Bessemers already taken are not willing to sell further at the same price. The coal strike is already stopping boats, and a curtailment of the navigation season, with the added possibilities of mining strikes which have already begun on the Mesabi—means higher freights and possibly higher wages to miners. Trip charters from the head of the lake have been made at 75 cents. Mesabi shipments have been interfered with somewhat by the strikes.

Pig Iron. One Shenango valley furnace, the Stewart, is still running, but otherwise there is a general banking in both valleys. In Cleveland one stack has been kept active by drawing upon Pocahontas coke. Not a pound of Bessemer iron is on the market in either valley at present prices. But one producer has any stock of Bessemer and this is being held for a price. An offer of $10.75 at Valley furnace is said to have been made for Bessemer without a transaction. Latest Pittsburg reports are that no Bessemer iron is to be had there and all producers but one are inactive. Every prominent steel maker in the district is thus likely to be a buyer of Bessemer when production is again resumed. At New Castle the stopping of the furnaces supplying the steel works has saved fuel for the longer operation of the latter. Foundry iron has not been affected a particle as yet by the shortening of production, the fuel shortage cutting off demand proportionately.

Finished Material. There is a better demand for structural steel and contracts to be let within the coming month in the Cleveland market, for new buildings, involve a goodly tonnage. Beams and channels are now sold on a basis of 1.20c to 1.25c, the price on small lots being equivalent to an advance of $4 a ton from the lowest prices touched. No strength has developed as yet in the demoralized bar iron trade. Mills in the valley that have long run as orders came in are entirely stopped in some cases, from inability to get coal and demand may thus have a chance to overtake supply. Light sheets are fairly active, but the heavier gauges, called for in factory building, are a drug. Old material has improved a trifle in movement, but not as to price.

THE CHICAGO OUTLOOK.

[SPECIALLY REPORTED FOR THE IRON TRADE REVIEW.]

The trouble in the sources of the fuel supply has had a bad effect upon the Chicago market, in that dealers are a little afraid to take contracts for early delivery. It is expected, also, that within a few days a good many of the foundries and other manufacturers of this city will be compelled to shut down from lack of fuel; in fact, already one or two shut-downs have been announced. This trouble is the only feature of interest in the market, save the fact that owing to the shortage of fuel, the mills and furnaces are a little stiffer as to price. The only sales made of any importance are some good orders of boiler plates, and also some fairly good sized orders for rails.

PIG IRON.—Sales of both Northern and Southern coke iron have been very small, no orders having been taken exceeding 200 tons. The bulk of the business done has been car load trade, and it is probable that the aggregate is not as large as that of the week before. Some of the Southern furnaces have stiffened up in price a little, because of the shortage of fuel, but no changes are made in the quotations. In Lake Superior charcoal iron nothing has been done, except in a small way.

BARS.—Business has been very small and no orders of any size have been taken. Quotations are continued at 1.10c to 1.15c for iron, while steel bars made from billets are quoted at 1.15c, to 1.25c. Steel bars made from scrap carry the same quotations as iron.

STRUCTURAL MATERIAL.—No orders of any size have been placed during the past week, although a small business has been done in small lots. Prices have been advanced a little from stock, and are now as follows: Beams and channels, 1.40c to 1.45c; angles, 1.40c to 1.45c; plates, 1.35c to 1.40c; tees, 1.60c to 1.65c. Quotations from stock are from 10c to 15c higher.

RAILS AND TRACK SUPPLIES.—Business has picked up quite a little in the rail trade in the past week, and several orders for fair sized lots of rails have been received. There are also quite a number of inquiries in the market, some of them for large lots, and it is likely that they will be closed in the near future. Quotations are as last reported: Rails, $25 to $27; splice bars, 1.40c; track bolts, 2.30c to 2.40c; spikes, 1.75c to 1.80c.

BILLETS AND RODS.—The local mill is refusing to take orders for delivery beyond the first of July at the present prices, as it is expected that sales can be made on quite an advance over these quotations. The same situation exists in the rod business, but the nominal quotations are are continued at $17.25 for billets and $26.50 for rods.

PLATES.—Quite a good lot of boiler plate has been sold in the past week, and the inquiry is still large. Quotations are now made as follows: Tank steel, 1.35c to 1.40c; flange steel, 1.65c to 1.75c; fire box steel, 3 75c to 4c; boiler tubes, 75 per cent. discount.

MERCHANT STEEL.—Several good sales of tool steel have been made within the past week, aggregating quiet a good tonnage. Aside from these transactions, the market has been quiet. Quotations are unchanged: Open-hearth spring, machinery and tire steel, 1.85c to 1.90c; crucible spring, 3.50c; machinery, 4.50c to 4.75c; tool steel, 6½c and upwards.

SHEETS.—Black sheets have sold fairly well in the past week, and the demand seems to be improving. Quotations are still made at 2.30c to 2.40c for No. 27 common. Galvanized iron is having a very fair demand, and several sales of good lots have been closed in the past week. Quotations are still made at 80 per cent. discount, although there are rumors of lower figures.

OLD RAILS AND WHEELS—One sale of 500 tons of old iron rails was made, to go out of the city. The price was not obtainable. Quotations are nominally as follows: Old iron rails, $10.50; old steel rails, $7 to $10, according to length, etc.; old wheels, $10.50 to $11.

SCRAP.—A sale of 1,000 tons of steel scrap was made in the past week, at private terms. Quotations are nominally as follows: No. 1 forge, $9; No. 1 mill, $6 to $5.50; No. 1 machinery, $7; axles, $13, cast borings, $3 50; wrought turnings, $4; axle turnings, $5.50; mixed steel, $5; coil steel, $7; leaf steal, $8; locomotive tires, $8; heavy cast, $7; stove plate, $5.

GENERAL MARKET RESUME.

[SPECIALLY REPORTED FOR THE IRON TRADE REVIEW.]

Pittsburg. The banking of furnaces in this district has gone on the past week, owing to the coal and coke strikes, until the Braddock group are practically all that are active. The big coke pile which the Carnegie Steel Co. have kept there for the past three years is reckoned to be a four or five weeks' supply. Some pig iron producers banked last week to save their fuel for their steel works; but the strike is now having its effect upon the mills, hundreds of employes in Pittsburg being laid off. The demand for Bessemer pig and billets is of course limited, under the circumstances, but buyers whose wants were urgent have paid $11 for prompt lots of the former in the past few days, and some small lots of billets for quick delivery have sold at $17. Transactions in the latter part of last week were at $10.75 for Bessemer and $16.25 and $16.40 for billets May and June deliveries. There is practically no Bessemer to be had and the same is true as to billets. The using up of stocks meantime guarantees a strong market when the coal strike is over. Finished material is firmer and producers who use oil or gas as fuel, or those fortunate enough to have accumulated two or three weeks' stock of fuel are getting better prices.

Louisville. There has been no change in prices as a result of the coke strike, though the tendency has been to make buyers desiring iron for future delivery willing to contract for reasonable amounts for deliveries extending through the year provided they can purchase at prices ruling the last week. Furnaces are not yet disposed to sell heavily, as they cannot measure the effect of the continual strikes in the coal fields on the iron industry. It is possible that some will have to shut down and when they resume they will have contracts already taken that will keep them employed some time without assuming any new ones. Among pipe shops, car shops, and stove foundries there is yet great complaint of the low prices their products bring. There has been no change of moment in iron and prices remain upon a basis thoroughly unsatisfactory.

Cincinnati. Unquestionably, general demand is extremely light; lighter, perhaps, than it was a month ago. At the same time, the leading companies are probably booking more iron than they are making, and some of them are compelled to withdraw from the market on leading grades because their entire capacity on such grades is sold ahead. Another feature which in ordinary times would have a marked influence upon the market is an inevitable curtailment of output, owing to the strikes of bituminous coal miners. Little attention seems to be paid to this, and yet a shutting down of the Connellsville ovens for a month or two would have a marked effect upon production in the North, and a continuance of the miners' strike in Alabama would have a like effect in production of Southern iron.

THE IRON TRADE REVIEW

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IRON AND STEEL MANUFACTURE, FOUNDRY AND MACHINERY TRADES, IRON ORE PRODUCTION, TRANSPORTATION, AND GENERAL INDUSTRIAL PROGRESS.

PUBLISHED EVERY THURSDAY BY
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ENTERED AT THE POST OFFICE IN CLEVELAND, O., AS SECOND CLASS MATTER.

MAY 3, 1894.

AFTER THE COMMOTION, WHAT?

Leave out all the childishness, the crankism and the mountebankism from the "industrial army" movement and there is a residue of the serious that makes thoughtful citizens more thoughtful. The newspaper clap-trap and sensationalism, the village gala-day commotions, as the army passes through, and the off-givings of men whose opinions in ordinary times wouldn't be repeated, much less be put in type, are one thing; quite another matter and of deeper import, is the restlessness of unemployed thousands, to whose serious condition Coxeyism serves to direct attention. There is a message to the country in this turmoil, but the noise of marching vagrants has no more relation to it than the cymbal and drum bombardment of the Salvation Army has to the message to which these are employed to attract attention.

Call the Washington crusaders, tramps and ragamuffins, or what you will, the significant fact about the whole movement is that in most cities they have been recognized and assisted by "organized labor"; and striking unionists and unionists who are simply without jobs have apparently been glad of the opportunity to turn the public eye upon labor's plight. There have been great local assemblages of the unemployed, and here and there processions, with riotous proceedings—not to the point of bloodshed, but not far removed from open outbreak. The trouble has come in most cases from the too deliberate movement of the authorities in providing public work. There is an undercurrent of sentiment, to which these proceedings give expression, that somehow work must be found for men whose families want for bread, and that the general body must furnish it. In other cases, as in the May Day parades, the occasion was one of special protest against the beggarly wages which the panic has made the rule in so many lines of industry. These local and special questions will be settled, as they always are, by some makeshift. Where wages are at issue, concessions will be made and work will resume. The coal strike, for example, will be adjusted in this way. Being a question of wages and little else, there will be a test of endurance and then some sort of agreement.

But the greater question which will not be settled by strikes and lock-outs, however numerous these may be in the near future, is that of a more stable basis for industry. We refer not only to better immunity to capital from disturbance by legislation, but to some *modus vivendi* that will tend to convince labor that its interests are closely allied with capital and that the latter is disposed to give it its fair share of the joint product. The political upheaval of 1892 was a social overturning at bottom. And while plenty of wage earners have been convinced by the hardest experience of their lives that they were mistaken as to the remedy, we do not find that the belief has been given up that labor has a grievance.

There will be many men out of work for some time to come and there will be thousands of men to whom the uncertainty of employment may come to mean practically the certainty of not getting it. How the problem thus presented is met by that portion of community that must do the thinking and planning, will go far toward determining the tranquility, or the reverse, of the months that are ahead. The situation is full of perplexity, but it must be faced with an appreciation of the fact that there is more in it all than the mere matter of settling this and that wage dispute by a more or less unwilling yielding of a point here and a point there. Heavy losses by capitalists have made it hard for many of them to treat calmly with those whom they consider to be in a measure responsible for much that the country has endured. Idle wage earners, who know nothing and appreciate little of the stories told by balance sheets, and make up their judgments on the fact that capital lives on in plenty while even provident labor has exhausted its savings and sees nothing ahead, are not in good mood to be reminded of their mistakes.

There is need of utmost conciliation and restraint. And while all speed is called for in the adjustment of the legislative basis of the new industrial campaign which the country must soon enter upon, there should be general and serious thinking as to ways and means to better relations between wage-payers and wage-earners. And on this ground, let it be hoped that the politicians may have some fear to tread. The country has had politics to its distraction. When trades unionism was making such rapid advances in the United States 10 and 11 years ago, and the Knights of Labor gathered power in a twelvemonth that promised to make them a controlling factor in politics, there was much earnest discussion of co-operation between employer and employed and profit-sharing had many theoretical supporters. But the activity in unionism proved to be only a passing phase and solutions of the labor problem came to be less discussed.

Is not the present the time to take up the problem with a view to making some real and permanent advance toward a new basis? Profit sharing has made an excellent record as a means of eliminating discontent and promoting friendliness and co-operation. It is no longer a theoretical solution, but one that has gained ground on the strength of practical work. That those who know what it can do stick to it, is good proof that there is virtue in it. Will not the coming year—or whenever there shall be profits again—be an opportune time for more general tests of its benefits?

PITTSBURG'S SHIP CANAL PROJECT.

That alluring project for a ship canal from Lake Erie to the Ohio River is again upon Pittsburg's mind. Certainly there can be no complaint that the campaign of education has been neglected. It has gone on with more or less vigor for a decade or more. Five years ago a Pittsburg legislative commission took it up and had sur-

veys and estimates made. Last year Congress was appealed to for an appropriation for preliminary surveys, but while a Pittsburg delegation, enthusiastic and well informed, was on the ground pushing for favorable action, Congressional skepticism was proof against the assault, and the river and harbor bill passed without the desired allowance.

Pittsburg's Chamber of Commerce took up the subject again last week and referred to a committee a proposition to organize a provisional committee to promote interest in the construction of the proposed canal. A paper by Mr. John E. Shaw, read before the chamber, gathered up the arguments, estimates and facts heretofore presented. Pittsburg's commerce with the lakes in iron ore, coal, lumber, etc., now 7,000,000 tons a year, would be swelled he said, to 10,000,000 or 12,000,000 tons. It was predicted that when Pittsburg could carry ore from Lake Erie to her furnaces and mills by water and float her heavy iron product and coal to the Great Lakes, she would "have command of the situation and care little for competition at home or abroad."

The estimate of the legislative commission of 1889 put the cost of the canal at $27,000,000. The Manchester canal, Mr. Shaw continues, cost $75,000,000 and resulted in "releasing the iron industry from a prohibitive tax." The Suez Canal cost $90,000,000 and pays large dividends. Rather a long distance to go for arguments but here is more that is quite as far-fetched:

"Now, if the cost of the Erie canal is less than one-half the cost of either the Manchester or Suez canal, and the tonnage on coal, iron ore and lumber alone from Pittsburg and points along the line of the canal with the lakes amounts to 10,000,000 tons annually, and the canal can transport this tonnage with a profit to itself at 30, 40 or 50 per cent. below rail rates, it is easy to estimate the amount of business the Erie canal would start with, and some idea can be formed of the enlargement and growth of the business of such a waterway from the fact that the combined railroad tonnage of the railroads entering this city in 1892 aggregated 37,999,392 tons."

The weakness of all the pleas for a canal from Pittsburg to Lake Erie is the assumption that the freights to Pittsburg would practically cut present rail freights in two. It is never taken into consideration that the latter-day freighters of the lakes, that carry all the way from 3,000 to 4,000 tons of ore on a trip would not go into such a canal. And lake traffic is drifting more and more into the hands of the big carriers, since profitable operation under latter-day rates is only possible to boats of largest capacity. The time required to go to Pittsburg and back to the lake would be entirely out of proportion to the mileage—would be as much, lake men have estimated, as is required to go to Lake Superior and bring down a cargo. It can be seen that freights from the head of the lake to Lake Erie ports become no basis whatever for comparison. It is not shown, but has always been taken for granted, that a canal would materially reduce the charge now made by railroads. We are disposed to question, on the evidence at hand, whether the small boats that would do Pittsburg's carrying under a canal regime, would put down cargoes as cheaply at Pittsburg docks as the big steel steamers, of capacity possible with a 20-foot channel, operating in conjunction with railroads and breaking cargoes at lower lake ports.

A LEADING Senator among the tariff conservatives of the majority writes to a friend that he is more concerned about the passage of "*a* bill" than about the success of "*the* bill." The country has known for some time that "*the* bill" could not pass, but what it most wants now is prompt information as to what sort of "*a* bill" the far-apart elements of the Senate can agree upon and push to a vote.

AMONG THE IRON MINES.

In the week ending with April 26, 29,494 gross tons of ore were shipped from Two Harbors, the best first week record in the history of the port. Of Minnesota ore 9,491 tons were shipped; of Chandler, 10,081 tons; of Canton, 8,343 tons; of Franklin, 1,579 tons. At Marquette the first week's shipments were 12,023 tons.

At Milwaukee last week Miller, Noyes & Miller sold, under power of sale conferred on them by Ferdinand Schlesinger, 6,615 shares of Chapin iron mining stock to Charles Schley for $661.50, which was at the rate of 10 cents a share. The par value of the stock was $165,375, so that Mr. Schley obtained it for 1-250th part of what it was once worth. Mr. Schley represented one of the banks that held Chapin stock as collateral, the institution thus getting a clear title to the stock.

Capt. John H. Taylor has tendered his resignation as superintendent of the Ashland mine, to take effect May 1st. Capt. Taylor is one of the pioneer mining men of the range, and he has been in the Lake Superior district over thirty years. He started explorations in this district May 15, 1885. He opened the Ashland mine in this city, and the Germania mine in Hurley, and has been identified with their management from the start. To Capt. Taylor belongs the honor of mining the first ore shipped from the Ashland ore docks.—[Ironwood News Record.

The Commonwealth Iron Co. is now employing 140 men at the Badger mine nearly all of whom have been working half time the past winter. In the event of a sale now pending being consummated all the miners will be put on full time.

Five hundred idle miners at Iron Mountain, whose families are in need, paraded the town last week, demanding a two weeks' supply of provisions. A committee of citizens was sent to Lansing to enlist the interest of the Governor.

The employes at the Franklin mine on the Mesabi struck on May 1 for $1.50 a day. The pay has been about $1 heretofore. It is reported that the men employed at the Oliver, Auburn and Norman mines were compelled by the strikers to go out.

About 100 men were put at work at the Tilden and Colby mines last week loading ore from the stockpiles. This week an additional force of 250 men was given employment in the mines.

Work at the old Lake Angeline mine, which was closed down some weeks ago, was resumed on May 1. This gives employment to 150 additional men. At present 400 men are in the company's employ and it is expected this number will be increased later to 600. The company's main object in starting up the old mine is to lessen the cost per ton on its entire output. The ore can be produced at the old workings at less cost than at the new mine.

It is probable that work will be suspended before many weeks at the hematite shaft of the Lake Superior Iron Co. The 100 men at work there will probably be transferred to Section 21 mine near the Winthrop. The company has made extensive preparations for developing its Section 21 mine. A fine new plant of machinery has been put in and numerous other improvements have been made. At present 80 men are employed there.

THE Excelsior Paint & Roofing Co., of 155 Duane st., New York, whose specialties are roofing, roofing materials and paint, direct attention in their announcements to the fact that no tar is used in their Eagle brand roofing, and that its cost is one-half the price of tin or shingles. Estimates will be furnished on the cost of complete materials for roof if size is sent them by mail. The same firm are manufacturers of rubber paint, the durability of which is emphasized in their literature. The Eagle roofing is ready for use as it comes from the manufacturer and its application calls for no special skill or instruction.

THE Etna Foundry & Machine Co.'s plant at Warren, O., which the Lloyd Booth Co., of Youngstown, expected at one time to utilize for the manufacture of tin mill machinery, will be converted into a steel range and hot air furnace plant.

ORE STOCKS ON DOCK.

2,588,370 TONS AT LAKE ERIE PORTS, MAY 1.

Complete figures from all docks to *The Iron Trade Review* show that there were at Lake Erie ports May 1, 2,588,370 gross tons of iron ore. This is an increase of 492,573 tons over stocks on dock at the same time last year and of 1,051,182 tons over stocks reported May 1, 1892. The shipments from Lake Superior mines in 1893, by lake and rail were 6,058,955 tons. All that did not come to Lake Erie ports went direct to furnaces in Illinois, Michigan, Wisconsin and Minnesota, and may be regarded, therefore, as having gone into consumers' hands. The excess of this year's amount on dock over that of May 1, 1893, as stated above, is 492,573 tons. Deducting this from 6,058,955, shows that in the twelve-month ending May 1, 1894, there were sent to furnace yards 5,566,382 tons of Lake Superior ores, as against 8,515,634 tons in the year ending May 1, 1893, this latter being the largest year's record of shipments to furnaces in the history of the region. The figures in the following table show the stocks on dock at the opening and at the close of navigation, in the past three years, at the various ports. The date of opening is made uniformly May 1, for statistical purposes. While a few cargoes have come down before May 1 in some years, as in the present year, these are excluded.

PORTS.	CLOSE OF NAVIGATION.			OPENING OF NAVIGATION.		
	Dec. 1, 1891.	Dec. 1, 1892.	Dec. 1, 1893.	May 1, 1892.	May 1, 1893.	May 1, 1894.
Toledo	122,515	71,409	92,911	62,960	11,863	44,500
Sandusky	122,000	87,500	78,439	85,500	74,875	65,772
Huron	14,910	45,000	89,000	5,000	40,000	56,791
Lorain	250,812	147,600	201,632	115,919	99,300	170,391
Cleveland	1,114,762	1,347,992	1,163,930	452,664	628,639	821,923
Fairport	597,617	610,609	578,033	255,422	287,727	311,494
Ashtabula	903,957	1,312,658	1,296,431	361,806	712,355	762,139
Conneaut	.....	.....	91,337	.....	.....	68,485
Erie	252,916	401,683	359,827	131,437	173,569	222,094
Buffalo	129,000	125,000	119,170	66,480	67,469	64,781
Total	3,508,489	4,149,451	4,070,710	1,537,188	2,095,797	2,588,370

The total rail shipments from Lake Erie ports to furnaces in the Winter of 1893–4 will appear by setting down the totals of the above tables thus:

	Tons.
On dock at Lake Erie ports at the close of navigation, Dec. 1, 1893	4,070,710
On dock May 1, 1894	2,588,370
By rail to furnaces in the Winter of 1893–4	1,482,340

Adding to this amount the shipments to furnaces during the season of navigation in 1893, which were 3,358,148 gross tons, we find that the total shipments to furnaces from lower lake ports in the year ending May 1, 1894, were 4,840,488 gross tons. The table below shows shipments to furnaces from these ports for six years:

Year ending—	Gross Tons.	Year ending—	Gross Tons.
May 1, 1894	4,840,488	May 1, 1891	5,148,669
May 1, 1893	6,102,125	May 1, 1890	4,936,637
May 1, 1892	5,802,496	May 1, 1889	3,928,626

The statement of Winter shipments from Lake Erie ports in the past ten years is as follows:

Winter of—	Gross Tons.	Winter of—	Gross Tons.
1893–4	1,482,340	1888–9	1,289,802
1892–3	2,053,654	1887–8	855,141
1891–2	1,971,301	1886–7	817,168
1850–91	1,231,264	1885–6	1,090,648
1889–90	1,670,878	1884–5	1,295,220

A ten years' record of iron ore stocks on Lake Erie docks at the opening of navigation, according to statistics gathered by *The Iron Trade Review*, is contained in the following table. It shows how the tendency to bring down unsold ore has grown in the past few years, and suggests that a clearing-up year and a fresh start would be helpful to all concerned:

Year.	Gross Tons.	Year.	Gross Tons.
1885	556,657	1890	936,228
1886	373,321	1891	2,662,223
1887	149,304	1892	1,537,188
1888	703,720	1893	2,095,797
1889	558,753	1894	2,588,370

Personal.

Samuel Summers, secretary and treasurer of Summers Bros. & Co., the well known iron manufacturers of Struthers, Mahoning Co., O., died on Saturday, April 28, after an illness of four weeks, of typhoid fever. Mr. Summers was employed in the office of Andrews & Hitchcock until 1881, when he embarked in sheet iron manufacture. He is survived by his wife and three children.

Thos. W. Williams, of Youngstown, has been made superintendent of the Hubbard (O.) Co-operative Iron Co. Thus far the operation of the plant has not been entirely satisfactory.

Wm. H. Baldwin was elected secretary of the Ohio Steel Co. at a meeting of directors at Youngstown, April 27. Mr. Baldwin has been connected of late with the Union Iron & Steel Co.

Mr. C. B. Beach, vice president of the HP. Nail Co., Cleveland, is announced as a candidate for the Republican Congressional nomination in the 20th Ohio district.

C. C. Merritt, of Duluth, the well known Mesabi range pioneer, whose illness was mentioned in our last issue, died April 27. Heart trouble was the immediate cause of death.

Mr. N. G. Williams, Jr., is secretary, treasurer and general manager of the newly formed Detroit Twist Drill Co. A recent item in these columns inadvertently referred to Chas. M. Swift as treasurer and general manager.

Birdsill Holly, the eminent engineer, inventor of the Holly waterworks system, is reported dying, by a dispatch from Lockport, N. Y. He is 72 years old.

James D. Ray died at his home in Duluth, April 27, aged 73 years. He was a pioneer in the region at the head of Lake Superior, removing from Ashtabula, O., in 1864. A large amount of Duluth property stood in his name and he had important holdings on the Mesabi range, being interested with Louis Rouchleau in the Rouchleau-Ray Iron Land Co.

The Coke Situation.

The past week has seen the beginning of evictions of strikers' families in the Connellsville coke regions. Many of the strikers are destitute but they are determined, and their willingness to follow the lead of the miners' union organizers is one of the wonders of the movement. Some scattering coke plants are in operation but it is probable that less than 1,500 ovens are active. The scale committee of the strikers, by direction of a convention held at Scottdale, on Monday, sent a circular to the operators in which they ask for a meeting Saturday, May 5. The circular says the operators are aware the workmen cannot make a decent living at present wages, and the strikers ask that an agreement be made making 90 cents per 100 bushels for mining the minimum basis.

The output of Connellsville coke as given by the *Courier* for the week ending April 21, was 105,796 tons, compared with 93,276 tons the previous week, 71,987 tons the week preceding that and 107,101 tons the week before the first strike. Shipments were 5,483 cars, against 4,691 cars the week before. The list of active ovens aggregated 10,556, an increase of 904. Western shipments showed an increase of 500 cars in anticipation of the strike of last week, being partly due also to a strengthening of demand following the curtailment of operations three weeks ago. If the men get an advance in wages coke prices will have to come up, and the quotation of $1 on furnace coke would at least be maintained.

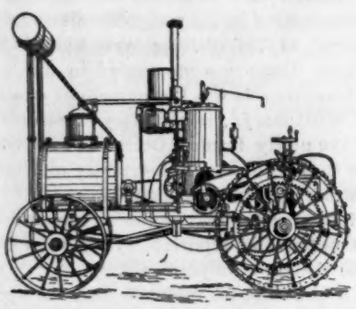
COMMEMORATING its 25th anniversary the *Coal Trade Journal*, of New York, issued a souvenir edition last week that in its typographical and illustrative features, the prosperous look of its bold-face and display-type pages, and its information about coal men and coal business, is a very triumph. The *Journal* is to be excused for the conscious pride visible here and there in the great edition.

GASOLINE TRACTION ENGINE.

We illustrate in this connection a traction gasoline engine which is the result of several year's experimenting. While the type of engine shown is not the first constructed, it is the first that the builders have considered perfect, and they are now ready to fill orders. The Van Duzen Gas & Gasoline Engine Co., have been making stationary gasoline engines for several years and are pioneers in the business, it will be seen that they are still taking the initiative. They received numerous letters urging them to construct this engine and not have a few orders for them, notwithstanding the fact that none were built, and to this encouragement a great part of their success was due.

The Van Duzen traction engine has neither fire, coal, wood nor steam, no smoke, sparks, cinders nor ashes, no boiler, no steam. It dispenses also with other concomitants of the steam traction engine; team, tank and man to haul water and fuel. The hiring of an engineer is also unnecessary. This engine can be started in the morning and run until noon without attention from anyone and as all the bearings are supplied with oil cups that will run 8 to 12 hours without refilling, there is no possibility of their cutting.

The gasoline traction engine is nothing new so far as the engine is concerned; it is merely the appliance of this engine



THE VAN DUZEN GASOLINE TRACTION ENGINE.

to this use that is new. The cut will show the construction of the engine. Most of the weight is over the driving wheels, which gives it more advantage in hauling a load over rough and hilly ground. The manufacturers report that orders are coming in very fast for these engines. Inquiries for catalogues, addressed to the Van Duzen Gas & Gasoline Engine Co., of Cincinnati, will be promptly answered.

Indiana Gas Holds Out Best of All.

The gradual restriction of the consumption of natural gas to domestic use is noted in the annual report of Special Agent Joseph D. Weeks, of the United States Geological Survey. The only State in which its use for manufacturing purposes increased in 1893 is Indiana. The total value of natural gas consumed in the country in the year was $14,346,250 against $14,800,714 in 1892. The higher prices charged for the gas in 1893 were the cause of the decrease. The greatest value of the gas consumed in any one year was $22,629,875 in 1888. Since that time there has been a gradual decline, with an aggregate of about $8,300,000 less for last year than 1888.

All states show a falling off in the value of coal or wood displaced by the use of gas. The amount of this reduction in Pennsylvania was $420,000; in Ohio $48,000, and Indiana about $1,300. The reported number of feet of pipe laid increased during the year to 11,989,657 in Pennsylvania, 5,720,373 in Indiana and 1,404,098 in Ohio. The largest production of the gas in Pennsylvania was $19,282,375 in 1888, since which it has fallen to $6,488,000. Ohio showed the largest falling off in production. In 1892 it was $2,136,000, while in 1893 it went down to $1,510,000.

The most important gas field in any state is shown to be in Indiana, where estimated area of productive gas territory is about 2,500 square miles. While the supply is falling far below the demand in other large gas fields, it is declared to be well sustained in Indiana and the supplies are being obtained from the state by factories located in other gas territories. The value of the product consumed in the State in 1893 was $5,718,000 against $4,716,000 in 1892.

HIGHER STANDARD OF BOILER MATERIAL.

In writing to the *Ohio Valley Manufacturer* on the above subject, H. R. Barnhurst, secretary of the Union Iron Works, Erie, Pa., refers to his 14 years in boiler making and makes these points as the result of his observation and experience:

"Never before have boiler materials been of a better quality than to-day. The qualities of high ductility and elasticity, coupled with high tensile strength, are attained to a remarkable degree in the very cheapest grades of boiler steel. When I say this I, of course, exclude tank steel, that no honest boiler maker would permit to enter into the construction of a boiler, nor do I believe the makers of boiler steel would sell tank steel knowing that it was to be used for such purpose. A boiler maker driven to such a course would doubtless soon be listed among the black sheep, as well by the seller as by the buyer.

"Boiler plates are bought of a given tensile strength and ductility, and constant tests are carried on at the mills to see that the standard is maintained. At any time the boiler maker can obtain a sworn certificate of the test of the steel entering into any given lot of plate, and if still in doubt he can have test pieces tested by disinterested parties, not connected with mills. In addition to this every boiler maker of any experience observes carefully the behavior of the steel plates under the various manipulations of the shops, and this test is so severe as to lead at once to the detection of inferior plates.

"The greatly reduced price of steel plate is not alarming, but the reverse. It shows the more complete mastery of the art and by lessening the margin between good steel and inferior, reduces the temptation to use the latter. It costs the mills as much to melt, cast, and roll, poor steel as it does good steel, and the whole difference figures back to the cost of the raw materials, which difference expressed in cents per pound, would make a small fraction.

"The danger in boiler making, lies less with poor material than with poor workmanship. Badly spaced tubes, rivets and braces, plates too thin for the work, deficient safety attachments, ill-proportioned settings, these are the points where the dishonest or ignorant get in their work, and for it they excuse themselves by the price they bind themselves to accept. A boiler shop fitted out with a complete equipment of modern tools costs a large sum of money and carries with it the assumption of good work. Contrary to popular prejudices, bad work in a boiler shop is the most expensive. Badly matched rivet holes take longer to rivet and caulk than true holes and the fitting up and testing, when poorly done, carry with them increased expense. Aside from this, sooner or later, bad work of any kind destroys the reputation of the shop from which it comes. In the matter of proportioning thicknesses, rivets and braces, the work usually speaks for itself to the educated eye, and, if the eye is not educated, the best plan for a purchaser is to put himself in the hands of a responsible builder, who has capital and reputation at stake, and trust him. Because a man can hammer up rivets or put a patch on a boiler creditably, is no token that he has mastered the art of boiler building. The proper proportions of all parts of a boiler, and its setting and the best methods of doing the work, is a kind of knowledge rarely found in the man that swings the hammer, and, not always in the head that governs the shop.

"The man who is always wanting something for nothing, who always 'has a lower price,' is the man who is always getting the value of his money, but not a cent more. He always buys 'cheap' goods and puts cheap men in charge of them. You can't guess where his troubles will end. I will say two things in conclusion: that never in the history of the world have boilers been as well made, and of as good material, as to-day, and second, that I don't want an iron boiler at any price."

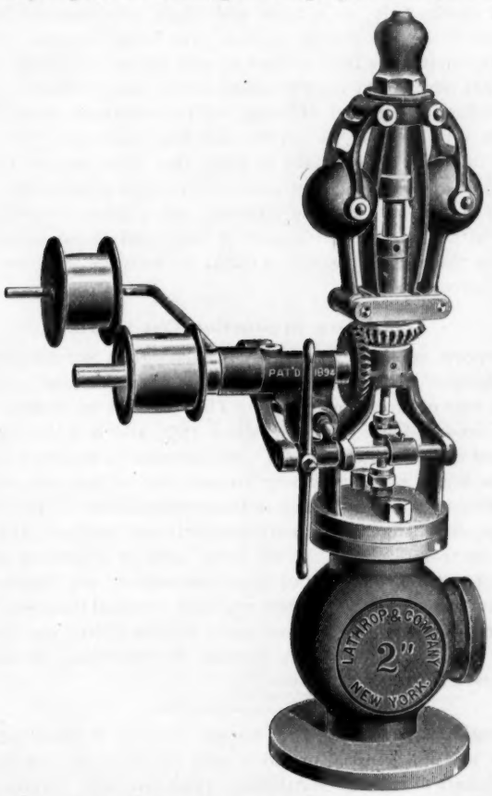
THE Cincinnati, Georgetown & Portsmouth R. R. are now building new shops at Columbia, O., and have closed a contract with the Lodge & Davis Machine Tool Co., of Cincinnati, for the entire equipment of machinery, including boilers, engines, planers, lathes, drill presses, shapers, etc.

PHŒNIX furnace at Youngstown, idle for relining, will start up when the fuel problem is settled.

LATHROP PATENT SAFETY GOVERNOR.

The latest invention in engine governors of the throttling type, and one which, from its results in close regulation, is meeting with good success is the S. P. Lathrop patent safety governor, of which illustrations are given on this page. The last few years have witnessed a rapid development of the automatic cut-off engine with its high class "shaft" governor, giving a very close regulation to meet the demands of electric lighting, etc. No corresponding development of high class, close regulation in this type of governor has been made until the introduction of the one herewith shown. Its close regulation and uniformity of speed have been attained by adhering to the theoretical conditions required and carefully developing them in practice. An examination of the construction of this governor shows that it retains all of the features that have proved valuable in the experience of a quarter of a century, with a number of new and important improvements added, which make it quick and powerful in its action and at the same time extremely sensitive to change of speed. These points render it safe and durable.

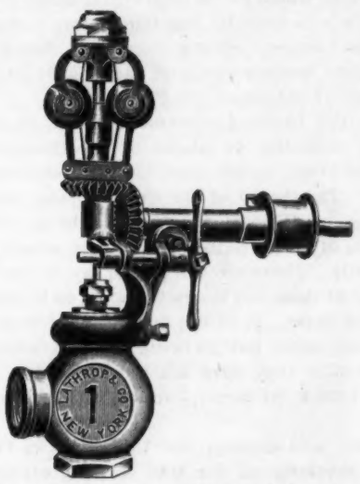
The illustrations show that the springs are composed of several leaves of thin, flat steel. These are tempered to a clock spring temper and under the conditions to which they are subjected are practically unbreakable. In their manufacture they require no bending or shaping to fit them for use,



but are merely plain, flat rectangular plates cut from any suitable piece of sheet steel, such as can be found at most supply houses. These springs are held in place without the aid of screws, bolts or pins and having no short turns to make or cramped position to occupy, and being entirely independent of, and unconnected with the balls, they have perfect freedom to perform their duty. They are held in place by springing them in notches or recesses provided in both the lower and upper sleeves. These sleeves are connected, as will be seen, by means of links connecting the upper one with the balls, while the arms of the balls connect it in turn with the lower sleeve, which is rotated by means of mitre gears.

The centrifugal force of the balls is opposed and balanced by the tension of the springs, which furnish the centripetal force. A maximum rate of speed will exactly balance these two forces, and this balance once reached, the slightest change of speed will instantly change the position of the valve and return the engine to its exact and proper speed. As the belt driving the governor overcomes all friction due to rotation, leaving little or none to be overcome by the centrifugal force of the balls, the governor must be very quick and sensitive in its action while at the same time having great governing power. A defect, inherent in some makes of spring governors lies in their spring construction and their liability to break, in which case all control of the engine is lost and it is left entirely at the mercy of the full boiler pressure, causing the engine to "run away" and usually resulting in the bursting of the fly-wheel and the wrecking of the engine itself. This defect is overcome in the construction of the Lathrop patent safety governor. While the construction of the springs makes them practically unbreakable, in case they ever should break, the action of the governor is such, that the engine, instead of running away, is instantly shut down. This feature is one of the most valuable ever incorporated in the construction of a throttling governor.

The valve of this governor is of large area and perfectly balanced in all positions throughout its travel. It is extremely sensitive to any change in the centrifugal force of the balls, but entirely passive under the varying pressures of steam.



Another valuable feature is the fact that it is not required that the size of the pulley on the crank shaft of the engine should be in certain and exact proportion to the diameter of the pulley on the governor shaft. This ratio of engine speed to governor speed is largely regulated by increasing or decreasing the centripetal force or amount of resistance to the centrifugal force of the balls, which is accomplished in a convenient and effective manner, giving the engine a large range between its maximum and minimum speed. Recent tests show a range of over 100 per cent. in the obtainable speed. This regulation is secured instantly as desired, while the engine is running.

The illustrations show the general design of this governor. The makers guarantee it to give the closest regulation of speed combined with the highest attainable economy in the use of steam. The manufacturers, Lathrop & Co., 66 Courtlandt St., New York, will furnish detailed information on application.

Balance Sheet of the Chief Southern Producer.

The annual report of the Tennessee Coal, Iron & Railroad Co., the chief pig iron producer of the South, has recently been published. It bears date of Jan. 31. For the year the net profits were $685,030. Deducting $655,073 interest paid and accrued, leaves a balance of $29,957. But loss on bond sales was $84,128 and the dividend to preferred stock was $40,000, so that the deficit was $94,171, as against a surplus for the preceding year of $290,069. The balance sheet shows the following figures: Floating liabilities, $1,814,796; quick assets, 2,417,310; surplus assets, $602,514; slow assets, $119,940; ultimate assets, $361,331. The report of the year previous showed floating liabilities of $2,994,434; quick assets, $3,883,177; surplus assets, $888,742; slow assets, $152,193; ultimate assets, $275,867. The results would be unsatisfactory in normal times, but in view of the business troubles the showing is considered encouraging. The consolidation of interests has proved highly beneficial. The floating debt was reduced rapidly, one sale of $804,000 treasury bonds being made at from 85 to 90 and the results of sales and collected accounts were applied to the same purpose. The output of iron has been largely increased and at a smaller cost.

PRESIDENT CRAMP ON ARMOR PLATE TESTS.

Since the original publication by the daily press of the facts connected with the fining of the Carnegie Steel Co., by the Navy Department, for furnishing armor plate not up to the standard previously attained, there has been much sensational writing about further possible disclosures in the same direction. It has been said that men in position to know would tell—for a consideration—of defects in plates on vessels in the Government's service. Statements of this sort have centered about the New York, as furnishing proof of sophistication in Government work. Collusion between navy officers and makers of steel plates and projectiles has even been strongly hinted at. Mr. Chas. H. Cramp, president of Wm. Cramp & Sons' Ship & Engine Building Co., whose opinion is worth much in this connection, says that the charges that armored plates and the projectiles used in testing them are not what they purport to be, are ridiculous, and no naval expert, in his opinion, would affirm their correctness. "To consider them gravely is to consider that fair dealing is out of date and that truth and honesty are at a discount." Speaking in detail of armor plate manufacture and particularly of the tests to which plates are subjected, Mr. Cramp says:

"The United States Government's tests of the size and energy of a projectile, as related to the thickness of armor plate, is just about 25 per cent. higher than that in use anywhere else. The theory of the United States tests is to take armor plates of different sizes and to bring them to bear against guns of such a caliber as would be actually opposed to them in battle. There are ten plates, say, in the lot or group, and any one of those ten is exactly as apt to be selected as any other one of them. It is not possible that makers of those plates, or any other human being through whose hands the plates pass after they have left the contractors' hands until they are put upon the target, can tell which one of them is to be chosen.

"As I have said already, the United States Government's tests err if anything on the side of too great severity, and I will explain what I mean by that. A 36-ton plate of 18-inch armor would cost roughly about $560 a ton, or say $17,000 for the plate, including a target. Testing this plate means its absolute destruction, no matter whether it comes up to the requirements of the contractor; it can never be used for anything after the test, least of all for arming a ship.

"Adding the supposed cost of the ammunition and other incidentals, the test of a single one of these plates therefore costs the United States Government $20,000.

"United States armor plates in two particulars excel those in use in the British navy. Great Britain plates her ships with a compound of steel upon wrought iron. The French ships are plated with the all-steel armor. The new navy of the United States has not only the superior armament of the nickel steel plate, which is an improvement on the best plates used abroad, but we have in fact a new kind of armor plate for our ships, which is a distinct advance even upon our nickel steel plates. I refer to the Harveyized steel plate, which combines the strength of the all-steel armor plate and the nickel steel armor with the hardness of surface produced by this new process. There are two improvements in armor plate alone, which the world owes to the United States—the nickel steel and the Harveyized steel.

"Now, on the other hand, what is the process by which Great Britain tests her compound armor plates? When one of these plates is to be tested a small piece is cut from it, the piece is then rolled down to a small thickness and it is then fired upon by a gun of small caliber. There is practically no such thing as testing in Great Britain of an armor plate ready to go upon the side of a battleship by the impact of such a projectile as would be fired against it in battle."

THE Mahoning Valley Iron Co., of Youngstown, O., made a proposition to the men employed in their plate mill to start up full on a large order if the men will accept a 10 per cent. reduction, so that the mill can meet Pittsburg competition. Orders for skelp iron to be used in Youngstown and Warren mills have gone to Pittsburg because near-by mills could not meet the price. At a conference on the subject Monday, it was decided that existing wages would be paid at the Valley mill until the convention of the Amalgamated Association.

GROWING DEMAND FOR HOME TIN PLATES.

A trade incident is narrated in this week's report of the tin plate market that furnishes an abundant commentary on the growth of the American industry. Briefly told, it is the statement that the home mills are so overcrowded with orders that out of seven to whom specifications for two carloads were sent not one was able to supply the goods on time. There are now 42 mills in operation in this country and others are projected, these marking the degree of progress from the much maligned "soap-kettle" affair of four years ago.

The reasons for this advance are many and obvious. A limitation of foreign competition was the first and necessary step. Then came the development of the industry in successive stages, until the consuming and jobbing trade began to depend upon the home mills for their supplies. This dependence has been, in fact, the main reason for the present activity, and yet it has not been enforced against the interests of either the jobbers or consumers, since prices are far lower than they were four years ago and no higher than the same grades of imported plates. Before the home industry was inaugurated, jobbing houses were compelled to carry large stocks of plates, owing to their distance from the source of supply, and were often subjected to an autocratic dictation in the matter of prices, this being necessarily enforced in turn against the consumers. Now, under the new order of things, they carry light stocks only, as a rule, and cases are reported where houses formerly carrying 3,000 or 4,000 boxes are now able to supply their trade from a stock of only 500 or 600 boxes. This is made possible by their nearness to the many different points of production, instead of being held to a market many thousands of miles away, as was the case four years ago. The fact that the mills are so busily at work that they cannot readily fill their orders is the best possible evidence of what they have done to develop American interests, when taken in consideration with the lower prices now in force and those prevailing before these mills became a factor in the trade.—[Stoves and Hardware Reporter.

Iron Ore Production Cut Down.

Reports received by the U. S. Geological Survey from 23 States and 2 Territories give a total production of 11,507,607 long tons of iron ore in 1893. This amount is smaller than that recorded for any year since 1887, and is a decrease of almost 29 per cent from 1892. No increase is reported in any of the States producing over 100,000 tons of iron ore, except in Minnesota, where owing to the development of the Mesabi range and the completion of transportation facilities, the output increased about 250,000 tons; and in Colorado where, owing to the production of larger amounts of pig iron locally, about 30,000 tons more iron ore were required than were consumed in 1892. The proportionate decline of iron ore production during the year was greatest in Michigan, Wisconsin, Pennsylvania and New York.

THE Manufacturer's Tool Supply Co., 17 S. Canal st., Chicago, is a new firm selling tools and supplies for machinists, composed of Frank Matthiesen, president and treasurer, F. W. Severin, vice-president, and L. B. Shaw, secretary and manager. Mr. Matthiesen was formerly in the purchasing department of the Chicago Sugar Refining Co., and is the son of the president of that company. Mr. Shaw for a number of years has been connected with the Machinist's Supply Co., of Chicago, and consequently has had a long experience in the business of selling machinist's tools and supplies, besides being very well known to the trade. The Manufacturer's Tool Supply Co. are handling only the very best lines of tools and supplies, and are selling the manufactures of such firms as the Wiley & Russell Mfg. Co., Waltham Emery Wheel Co., Cleveland Twist Drill Co., Morse Twist Drill Co., Kearney & Foote, and Billings & Spencer. Altogether they are well equipped to handle the trade, and in fact they report having already done an excellent business—fully up to their expectations.

LATEST reports from the Mesabi range mine troubles state that militia have been sent to Virginia to suppress the rioting by Franklin mine strikers who had compelled workers at other properties to stop.

IMPROVED CUPOLA FURNACE.

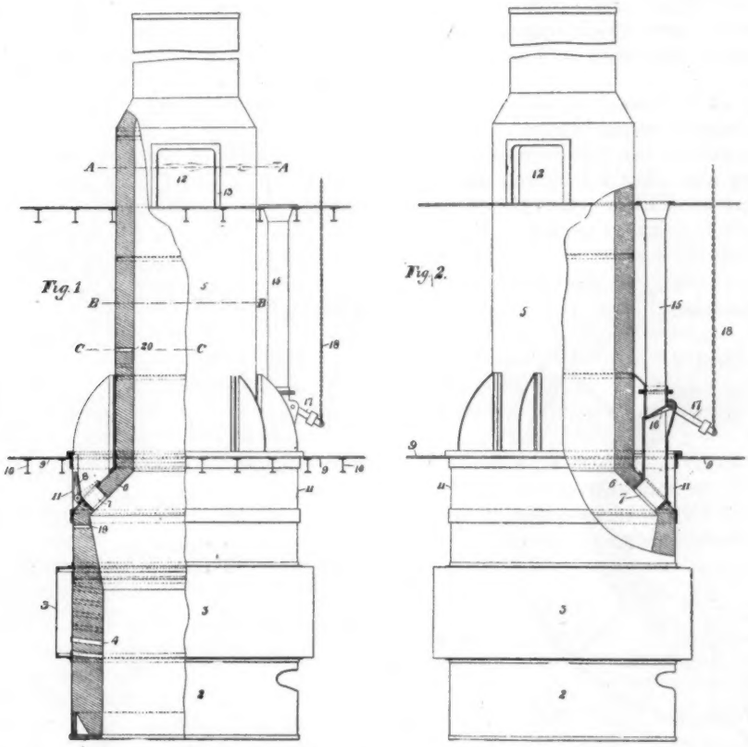
Wm. H. Bradley, of Mingo Junction, O., superintendent of the Laughlin & Junction Steel Co., has invented a cupola furnace, details of which are given below. These may be clearly understood by reference to the illustrations which we present in the same connection. Fig. 1 is a side elevation of the cupola partly in section. Fig. 2 is a sectional view showing the charging chutes. Fig. 3 is a cross-sectional view on the lines A-A, B-B and C-C of Fig 1.

In the present working of cupola-furnaces the fuel and metal are charged in together at a certain distance above the tuyeres, and if this distance is small the combustible gases rising through the charge are not wholly consumed and pass off above the charge at a high temperature, thus wasting the heat. If the distance is large, the fuel is consumed before it descends to the level of the tuyeres, and the metal oxidizes rapidly under the action of the blast, causing a loss of metal. Moreover, in the second case, the slag formed above the tuyeres chills as it meets the cold blast and clogs the cupola, and the CO_2 rising through the high charge, is changed to the combustible gas CO, which passes off and is lost. In the present practice, a mean of these extremes is used, partaking of the faults of each but in a lesser degree, and in the best results less than one-half of the heat of the fuel is utilized for the melting of the metal. Various expedients have been tried for over-coming these difficulties, such as blowing in air above the point of incandescent fuel, but this again raises the heat at such point and consumes the fuel, or with a short charge causes the gases to pass off at a high temperature.

The invention referred to is designed to do away with these difficulties and evil effects, creating a great saving in the cost of fuel and increasing the melting capacity of the furnace. It consists in charging in the fuel on a different level from that of the metal. The level for charging the fuel (depending upon the melting capacity of the cupola) should be at such a distance above the tuyeres that the fuel may become heated to the igniting point before reaching the zone of fusion, but not so high that the fuel will be consumed before descending to the tuyeres. The metal charging level should be at such a height above the fuel-charging level, that the gases of combustion may, before passing off, have sufficient time to be fully consumed and cooled down to the most economical point of temperature, while ascending through the charge of metal, thus utilizing the full effective heat of the fuel by preheating the metal.

In the drawings, the lower portion 2 of the cupola is provided with the usual tuyere belt 3, from which the tuyeres 4 lead into the furnace. The upper portion 5 of the cupola is smaller in cross-section, forming a stack portion concentric with the lower portion, the two being joined by the cone-shaped portion 6. Through this conical portion lead the charging chutes 7 for the fuel, and each chute may have a hinged door 8 for closing it, these chutes extending in a circular series about the cupola, and being preferably immediately beneath the fuel-charging floor 9 supported upon the I-beams 10. A circular band 11 extends upwardly from the lower part 2 of the cupola to the charging-floor 9, and incloses the charging openings. In the upper part of the stack is the metal charging opening 12, which is provided with a hinged door 13, the door resting against stops 14 when in its lowermost position, the closing of the metal-charging openings giving a natural draft at the fuel-openings, by which the combustible gases will be consumed.

In case the cupola cannot be easily fitted up with the fuel-charging floor, chutes 15 may be employed, or other suitable devices, leading downwardly from the metal-charging floor to the fuel-charging openings, which may have the hinged doors 16 therein, provided with counterweighted arms 17, which may be operated by a chain 18 from above. There is also a series of tuyeres 19 at or near the fuel-openings, and a second series 20 above the fuel-openings, to furnish air for burning the combustible gases. The air admitted at and above the fuel-charging openings may be regulated by any suitable device, so that the air will enter in sufficient quantity to consume the gases, but not in such excess as to cool the burning gases.



IMPROVED CUPOLA FURNACE.

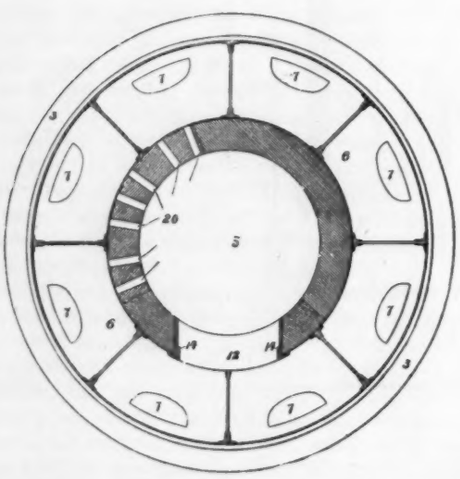
The operation of the device is as follows: The metal being charged in a central stack on an upper level, and the fuel in openings in the side of the stack at a lower level, or into openings at the cone sheet of a larger concentric stack, the metal will descend in the center with the fuel around the outside, the fuel thus being between the metal and the air-inlets, a condition which has been much sought after. The blast of air from the tuyeres thus meets the incandescent fuel at and above the tuyeres before it enters the zone of metal; being thereby heated to the temperature of the zone of fusion it unites with the carbon of the fuel and maintains a reducing and not an oxidizing atmosphere, hence no oxidation of metal takes place, and the slag and metal are not chilled. The flames and hot gases pass into the central zone of metal and ascend through the interstices, up to the fuel-charging level, where air is admitted to burn the carbonic oxide; the flames

and heat thus produced ascend through the interstices of the metal, preheating the same without burning the fuel. The fuel is charged at such a point above the tuyeres, that it just attains the igniting point as the zone of fusion is reached, since if too high the fuel is consumed before reaching the tuyeres, and the entering air chills the slag and oxidizes the metal, while if too low the fuel reaches the tuyeres in too cool a condition and reduces the zone of fusion, thus lowering the melting capacity of the cupola and wasting the fuel, which falls below the zone of fusion before being consumed and gives up its carbon to the metal, thus requiring a longer blowing in the converter and delaying each heat.

This distance between the charging point of fuel and the tuyeres depends upon the rapidity of melting of the cupola, since the more rapid the descent of the charge, the greater must this distance become. To regulate this distance there are several rows of tuyeres, one above the other, and if running slowly the upper tuyeres are used, the others being stopped off, the lower tuyeres being employed when running faster. The fuel having only a short distance to descend is not consumed before reaching the tuyeres, and hence the highest point of temperature in the zone melting fusion is at and immediately above the tuyeres at all times, while the slag formed at this point in descending, falls below the zone of blast and is not chilled thereby. The metal, as it melts, immediately falls below the line of tuyeres and is therefore not oxidized by the blast, and the hot gases and burning carbonic oxide pass up through the metal and give up to it their entire heat.

Mr. Bradley, commenting on his invention, says: "I am aware that it has heretofore been proposed to heat the metal above the point of introduction of the fuel merely by the surplus heat of the ascending gases, but I believe I am the

Fig. 3



first to so proportion the distance between the fuel-charging openings and the tuyeres, that the fuel is preheated just to the temperature of ignition when it reaches the zone of fusion, and to introduce air at or above the fuel openings so as to combine with the rising carbonic oxide and burn in contact with the metal alone, above the level of the fuel, especially when this air is so regulated as to give the proper amount for uniting with the carbonic oxide.

The advantages of my construction arise from the great saving in the expense of running the furnace due to the reduction in the amount of fuel employed, and from the total lack of any clogging or uneven action of the charge, while the invention is easily applied to existing conditions. Many changes may be made in the form and arrangement of the parts without departure from my invention, which I regard as lying broadly in the furnace having fuel and metal-charging openings at different levels and admitting air for burning the gases above the fuel-charging level."

Now that a receiver has been appointed, it is said that the West Superior Iron & Steel Co.'s plant will start up again, and that about 50 men will be employed. The claims against the company are said to total $2,000,000.

MACHINE SHOP AND FOUNDRY.

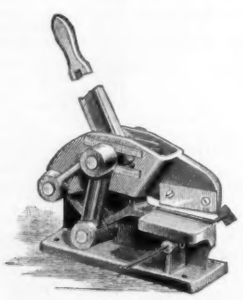
BIG MACHINE TOOLS FOR SHIP YARDS.

The part played by modern machine tools in the several directions in which improvements in shipbuilding are being effected is no unimportant one. Among the machine tools recently brought into use, the huge plate-flanging or bending machines, and the powerful shearing and punching machines, are certainly most notable. One of the former class in the Fairfield ship yard, with which the flanging necessary in connection with the Campania and Lucania was accomplished, is capable of operating upon cold steel plates 31 feet 6 inches in length, and up to 1⅛ inches thick. This represents perhaps the maximum capabilities of machine tools of this class with which ship builders are at present furnished. Similar, but in some cases slightly shorter and less powerful, flanging machines are to be found in nearly all the leading ship yards in the country. The makers of the Fairfield machine have supplied similar tools to nearly all the larger builders.

Many of the large ship yards also have patent hydraulic channel and angle bar shearing machines, specially designed for shearing the ends of heavy angle bars and channel bars of large section, such as have been employed in the frame structure of the latest Cunarders, and which promise more and more to be used as frames for large ships. These machines are designed to cut channel bars from five inches up to 15 inches broad, by six inches deep, and ¾-inch section, and are also adapted, without necessitating any alteration in the shearing blades, for cutting ends of ordinary angle bars either right or left hand, which is under some circumstances a considerable advantage. Plate bending rollers, also plate edge planing machines, have been subject to development in the way of having to deal with the large plates now common. The heaviest plate rolling machine yet made is to be found in the Fairfield establishment, where it was used constantly in the bending of plates for the Campania and Lucania. This machine is capable of dealing with plates up to 32 feet long by 1½ inches thick. A smaller machine has been supplied from Glasgow to Messrs. Cramp of Philadelphia, but capable of dealing with plates up to 32 feet long by 1¼ inches thick only.—[" Helps and Hindrances to Ship Building," Fairplay, London.

CORE ROD CUTTER AND SHEAR.

The illustration shows a hand shear intended especially for the foundry core room or other place where wire or rods are to be cut up. It will cut round iron up to ⅜ inch diameter



with ease. The gauge can be set at any length up to 15 inches. Shear blades are four inches long and arranged so they can be readily removed for sharpening. The handle is of malleable iron 15 inches long, and the arrangement is such that ample power is secured for the heaviest work the machine is intended for. It is intended to be fastened to the bench, weighs 30 pounds, and is made by the Springfield Machine Tool Co., Springfield, O.

MAKING A MACHINE RUN QUIETLY.

There is an impression that if a machine will run steadily in one place it will run just as well anywhere, when in reality the very foundation has a good deal to do with it. Not long since two men were setting up a light machine that gave no trouble where it had been at work for the last year or so, but

when the speed was started set up a discord that made the very floor the machine sat upon play the part of a sounding board. Some suggested that the men take hold of the machine and hold it out bodily with their hands, not allowing the machine to rest anywhere. It ran so smoothly and quietly that it was suspended from the floor beams overhead by rods, and is now running in that way to keep peace in the establishment. In several cases where high speed engines have made trouble in this respect, a platform for the engine to rest upon, suspended by rods and crossties from the framework above, has confined all the disturbance to the engine itself. It is not an uncommon occurrence to find an engine, when first erected on a firm foundation, set up a jar that does not feel right until it has loosened up the settings somewhere to give it this vibratory elbow room. However, when a machine sits so badly that it must be suspended by guy rods to give it a chance to shake without shaking down the whole building, it is time that the machine itself should be looked into and something done to bring it in harmony with the floor it is to rest upon.

THE OLD-TIME MACHINE SHOP.

Mr. J. F. Holloway, of New York, formerly of Cleveland, contributes to the May *Cassier's Magazine*, an article on "The Chalk Age of Mechanical Engineering." From it we take this realistic picture of the old-time machine shop:

"I can, perhaps, convey some idea of what the old-time machine shop had by naming some of the things it did not have. While it did have, as you will infer, a foundry at one end and a smith shop at the other, and between them little else than smoke and grit, fortunately the latter got so well ground into the apprentice boys of those days that it stuck to them all their lives and served to help them out of many a difficulty. There were no planers there, no slotters or shapers, no boring mills; and all we boys knew of their existence was tales told by bibulous tramp machinists, who, wandering out into the then far West, filled us with wonder as we sat about the stove at noontime and listened to the tales they told of the big tools they had worked on at Matty Baldwin's, in the Allaire, the Secor, or Novelty works, or at West Point. But not alone were all these wanting in the old-time shop, but as well were twist drills, except of the home made pattern, screw-cutting machines, relieved taps, etc., while jigs, standard gauges and reamers were either among the things not yet dreamed of or among those only hinted at as being possible in the far-off machine shops of the millennium.

"I never look upon one of the elegant and polished thread-cutting machines, in which the severest labor of the attendant consists in lifting the bolt up on the machine, and gently turning a lever to clamp it in its jaws, and then push it forward until it comes in contact with the well-shaped dies, which, under a stream of self-pumped oil, cut on it a clean, smooth and uniform-sized thread, and which, when finished, is dropped into the sawdust bath below, but that I am reminded of the well named 'jam plate' of my youth, and the flat-sided taper taps that kept it company. The rule of the smith was to swage down the end of the bolt until it would enter the nut, and the barberous screw-jamming tools, aided by the strained muscles and the sweating brows of the apprentice boys, bruised and raised up a thread outside the bolt, and inside the nut, so they would fit together. So uneven were their sizes, that each bolt and nut were fitted to each other, and when taking down a machine, woe betide the fellow who got them mixed!"

SHOP AND FOUNDRY NOTES.

Replying to the circular letter sent by this paper to prominent foundrymen some time ago, Mr. Geo. T. Reiss, superintendent of the Niles Tool Works Co., writes: "We consider that the application of chemical tests in addition to physical tests in foundry work is of great importance in getting good results. The desirable features in castings, particularly such as require a high finish, are not confined exclusively to strength; but the texture of the iron otherwise must be such that it will take this finish. The proper mixture for obtaining this result can only be arrived at chemically, after the influence which the various constituents of pig iron have upon its physical appearance are known. While we do not employ a chemist continuously, we have had frequent analyses made of pig irons and mixtures. With the aid of these and formulæ obtained from metalurgists of high repute, we have been enabled to keep our mixtures to a standard satisfactory to us. "In our purchases of pig irons we pay attention to the chemical analysis and keep on file analyses of all irons which we have ever used, likewise of various mixtures.

* * *

The educational campaign that is being conducted to give foundrymen the benefit of a wider knowledge of pig iron, is likely to be productive of good results. The Foundrymen's Associations, Eastern and Western, are calling on their most intelligent and practical members to give the public the benefit of their wide experience. Quite a decided difference is noted in the views expressed, but many points in common have been discovered. It is likely that it will be decided that for the smaller works, at any rate, simple tests will be adopted that will give satisfactory results without the necessity of calling in the chemist, except at intervals. For larger works, it may be found best to combine both methods. Rogers, Brown & Co., the well known sellers of pig iron, have undertaken to place in the office of each iron foundry in the United States a copy of the pamphlet on foundry mixtures written by W. J. Keep, of Detroit. It is the paper that was read before the Foundrymen's Association Wednesday, April 4, and published in *The Iron Trade Review* of April 12. It has attracted much attention and is now published in a very convenient shape for reference.

* * *

M. L. Andrew & Co., whose patent chuck was described in these columns some time ago, report that many manufacturers have sent spindles to them to be fitted to these chucks. They have had a goodly number of orders for the chucks and many inquiries. Among recent orders was one from England. A testimonial to which the firm refer with satisfaction has just been received from the Weir Frog Co., of Cincinnati. The writer says: "We have fitted two of our eight spindle multiple drills with these chucks and several of our single drill presses, and are more than pleased with the results obtained while using them. We feel perfectly safe now as to injury to our workmen by getting their clothes caught and at the same time we know that we have got something that will hold the drills in place. We have the chuck in use on 23 spindles and have 17 separate chucks to use with these, and in the near future we will in all probability equip the remaining eight spindle multiple presses, and the balance of the single presses."

* * *

The question of expansion of cast-iron during solidification is up for discussion again. M. Jacker, M. E., of Chicago, writing to the *American Machinist*, makes this statement: "I copy a memorandum concerning an experiment made by myself, 1880, at the Iron Bay Foundry, Marquette, Mich. A bar 1⅛ inches square, three feet long, cast in open sand, and measured as soon as the iron was sufficiently set to allow measuring, was found to be ⅛ inch longer than the pattern. It remained the same length for about 10 minutes, appeared to shrink after that time at a uniform rate as it cooled, and measured three feet when cold. The length of the pattern was three feet by the shrinkage rule. My object at the time of making the experiment was to observe the relative time and uniformity of shrinkage. Being astonished at the outcome I repeated the experiment with precisely the same result. Of course, this will not affect the work of the pattern-maker in regard to his rule. But it shows that the actual shrinkage of a casting after solidification may be considerably more than generally supposed, a fact which should be well considered in designing, molding and casting. The result will be different when casting in dry or green sand. A wheel cast in a chill is apt to come out smaller in diameter than a casting of the same pattern made in green sand."

MR. W. H. ROBERTSON, dealer in second hand iron and wood working machinery at 60 S. Canal st., Chicago, reports having had an excellent trade in the past three or four weeks, and a good outlook for the future. Mr. Robertson says it is his belief that business will be considerably better within the next few weeks, as the inquiry for second-hand machinery is growing larger every day.

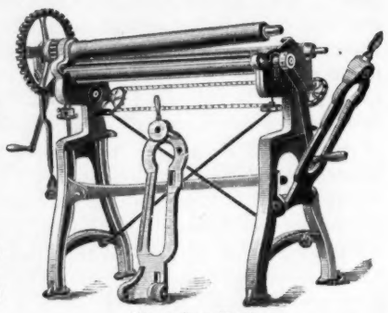
MACHINES FOR WORKING SHEET METAL

Patent Gap Shears.

Patent Gap Shears, Especially designed for Squaring, Trimming and Slitting. 6 to 18 inch throat for Slitting Wide Sheets, Complete for Tin or Iron to 14 gauge. Seven Styles of various lengths HAND AND POWER.

General Purpose Punch and Shear. Seven Sizes.

Rear Side.



Forming Rolls.

General Purpose Forming Rolls, all sizes. Quickly adjusted and instantly opened—A Revolution. Also Patent Crimping Rolls. Beware of Infringements.

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FIRE BRICK, FIRE CLAY,

For Blast Furnaces, Cupola Lining, Boiler Setting, Smoke Stack Lining, or Any Other Purpose.

EVERY CLASS OF SPECIAL SHAPES AND SIZES.

ALL KINDS OF

Foundry Supplies.

FACINGS, BLACKINGS AND MOULDING SANDS

Of All Kinds.

INDUSTRIAL SUMMARY.

New Enterprises:—

The following recent incorporations, specially reported for *The Iron Trade Review*, are of interest to the iron and machinery trades:

Rochester, N. Y.—Glazier Head-Light Co.; capital, $6,000; for manufacturing lanterns, head-lights, etc.; incorporators: E. C. Glazier, Nellie A. Glazier, F. P. Siddons, Rochester, N. Y. Address letters, care of Satterlee & Taylor, German Ins. Bldg., Rochester, N. Y.

Chicago, Ill.—The Carmichael-Wilks Range Co.; capital, $50,000; for manufacturing steel ranges and cooking apparatus; incorporators: D. L. Carmichael, W. B. McCloud, Perry Russell. Address letters care of Otho D. Swearingen, 162 Washington st., Chicago, Ill.

Milwaukee, Wis.—Milwaukee Steam Heating & Electric Construction Co.; capital, $25,000; for a general steam, hot water heating and electric construction business; incorporators: H. Jane, G. Kuntz, G. Crooke. Address letters care of David S. Rose, Milwaukee, Wis.

Carthage, O.—The Hess Spring & Axle Co.; capital, $100,000; for manufacturing and selling vehicle springs and axles; incorporators: Alfred Hess, Elmer J. Hess, Wm. E. McCall, Philip Roettinger, Henry Woost. Address letters care of Philip Roettinger, Cincinnati, O.

Chicago, Ill.—Hicks Stock Car Co., Limited; capital, $2,000,000; to buy, sell, lease, use, build and operate railroad live stock cars and freight cars; incorporators: Henry M. Heisel, Archibald Cattell, Jas. Mullen. Address letters care of Seth F. Crews, 218 LaSalle st., Chicago, Ill.

Chicago, Ill.—Chicago Pneumatic Railway Gate Co.; capital, $200,000; for the manufacture and sale of railway gates, signals, lamps and appliances; incorporators: Geo. H. Clark, Paul Schwarzlose, Frank O'Donnell. Address letters care of Geo. H. Clark, 749 Warren ave., Chicago, Ill.

Mt. Pleasant, Mich.—Mt. Pleasant Foundry & Plow Co.; capital, $11,000; to manufacture and sell farm and agricultural implements; incorporators: E. T. Quackenbush, James G. Clark, David H. Maurer, all of Mt. Pleasant, Mich. Address letters care of Jas. G. Clark, Mt. Pleasant, Mich.

Dayton, O.—The Dayton Gas & Gasoline Engine Co.; capital, $10,000; for manufacturing and selling gas and gasoline engines; incorporators: Edw. E. Euchenhofer, Robert M. Nevin, Christian J. Weinman, Wm. C. Weinman, Thos. C. Kennedy. Address letters care of R. M. Nevin, Dayton, O.

Dayton, O.—The New Era Iron Works Co.; capital, $50,000; for manufacturing gas engines and iron specialties, and doing general foundry and machine work; incorporators: J. R. Johnson, L. M. Johnson, V. B. Van Horne, A. M. Sullivan, Clara E. Van Horne. Address letters care of H. H. Prugh, Dayton, O.

New York City, N. Y.—The special Fire Alarm Electrical Signal Co.; capital, $50,000; for manufacturing and selling fire alarm signals; incorporators: Fred'k Pearce, 79 John st., N. Y. City; E. A. Morse, Rutland, Vt.; C. J. G. Hall, 261 Broadway, N. Y. City. Address letters care of C. J. G. Hall, 261 Broadway, N. Y. City.

Ironton, O.—The Oven Thermometer Co.; capital, $10,000; for manufacturing novelties of wood, iron and other metals, machinery, thermometers, pyrometers, castings, terra-cotta ware, etc.; incorporators: Henry D. Miller, Wm. S. Kirker, E. J Brid, Jr., J. G. DeBang, Chas. Campbell. Address letters care of J. G. DeBang, Ironton, O.

Chicago, Ill.—Curtis Hull Mfg. Co.; capital, $250,000 for dealing in and operating letters patent relating to improving machinery, steam boilers, engines, etc., and manufacturing business; incorporators: Aaron E. Hull, Chas. E. Whitmore, Chas. Ray Dean, Jno. W. Hill. Address letters care of Jno. W. Hill, 1131 Monadnock Bldg., Chicago, Ill.

Chester, Pa.—The Chester Traction Co.; capital, $500,000; for the construction and operation of motors and cables or other machinery for supplying motive power to passenger railways; incorporators: Eugene Harvey, Geo. Potteiger, Chas. F. Wagner, Jr., all of Philadelphia, Pa., Wm. Wilson, J. G. Dyer, Chester, Pa. Address letters care of W. B. Broomall, Chester, Pa.

Chicago, Ill.—The Standard Type Foundry; capital, $50,100; to manufacture, buy and sell type, type metal, leads, brass rule, electrotypes, cases, stands, printing presses, paper cutters, ruling, folding, stitching and binding, etc., machinery, etc.; incorporators: Samuel S. Parks, Eben F. Runyan, Jr., Edward D. Runyon. Address letters care of S. S. Parks, 95 Washington st., Chicago, Ill.

New Buyers in the Market, and Some of Their Wants:—

[If you are in need of machinery of any description, please notify *The Iron Trade Review* and we will put you in communication with our advertisers at once.]

The Camden Foundry & Machine Co., Camden, Ark., will want iron roofing, pulleys, shafting, and boxes.

T. R. Hackworth & Co., South Pittsburg, Tenn., will buy a drill press, machine for casting 4½ inch pinion, machine to turn 4½ inch pinion, set of forge tools, with blower, etc.

The Stout Mfg. Co., of 197 S. Canal st., Chicago, manufacturers of hardware specialties, will be in the market for drilling machines, gear cutters, milling machine and punching and shearing press.

The city of Kenyon, Minn., will receive bids on a water works plant until Aug. 15. Among the requirements are one duplex high pressure steam pump of 500,000 gallons capacity; 1,800 feet of cast iron pipe, and 4,500 lbs. of special castings.

The Wyckoff Harvester Co., for 20 years located at Perry, N. Y., is to be a Jamestown, N. Y., institution hereafter. Known

MOUNT SAVAGE FIRE BRICK.

UNION MINING CO.,

Proprietors of the CELEBRATED Mount Savage Fire Brick.

GOVERNMENT ⁂ STANDARD.

Established 1841. Capacity, 60,000 Per Day; 18,000,000 Per Year.

The First Manufactory of its Kind in the U. S.

Home Office and Works:—MOUNT SAVAGE, Allegany County, Md.

Branch Offices:—No. 1 Broadway, New York, N. Y.; No. 222 So. Third St., Philadelphia, Pa.; Lewis Block, Pittsburgh, Pa.

Fire Brick.

High Grade Fire Brick for Melting, Heating and Blast Furnaces.

CUPOLA LININGS, BOILER SETTINGS AND ALL PURPOSES FOR WHICH FIRE BRICK ARE USED—ALL SHAPES.

Ground Clay in Bulk or Sacks. Send for list of shapes.

THE AMERICAN FIRE BRICK & CLAY CO., Mineral Point, Ohio.

When you write to firms advertised in our columns, please mention the fact that you took their address from our paper. They will thank you for it.

as Wyckoff & Co. at Perry, the addition of Jamestown capital and a capitalization of $100,000 have brought a change of name as indicated above. For the present mannfacturing will be carried on at the old factory at Perry, but as soon as a site is selected building will begin at Jamestown. The company write that they will be in the market for a 100 h. p. boiler and for an engine of 60 to 80 h. p. and for complete foundry and machine shop equipment.

New Construction:—

Chambers Bros. & Co., Philadelphia, will erect a steel and brick foundry building, 80x50 feet.

E. D. Jones, Son & Co., of Pittsfield, Mass., will erect a new machine shop, 100 feet long and three stories high.

The Racine Malleable Iron Co. will accept none of the offers to locate elsewhere, and their burned plant will be rebuilt at Racine.

The Dora Furnace Co., Pulaski, Va., are erecting a brick foundry 40x100 feet. A portion of the furnace product will be melted in the foundry.

The Crescent Brass & Iron Works Co., of Detroit, Mich., are building an extension, 46x100 feet, to be used as a foundry. When the building is completed 20 more men will be employed.

The 22d street bridge bill for Pittsburg has passed Congress, with an amendment requiring a 500-foot span, and making the cost of the structure over $400,000. Director Bigelow says it will be built at once.

A Marion, Ind., dispatch of April 24 says: A contract for a tinplate plant, to cost $100,000 and to employ 300 men, was signed here last night. The contract is with E. Stanford, formerly manager of the tinplate works at Elwood, and one of the proprietors of a similar plant at Atlanta, Ind. The factory is to be in operation by September 1.

The Tamaqua (Pa.) Mfg. Co., who make a specialty of coal mining machinery, are about putting up a new foundry and machine shop, using the present building as a blacksmith shop and cleaning room when the new one is finished. They will add considerably to the equipment of their machine shop, and will put a new cupola and crane in their foundry.

The Pennsylvania Lubricating Co. are erecting a new plant at Pittsburg, which will be 60x100 feet, to be used in the manufacture of lubricants, oils, lards, etc. The contracts for boilers were placed with the Erie City (Pa.) Iron Works, while the Russell Engine Co., of Massillon, O., will supply the 35 h. p. engine. R. Monroe & Son, of Pittsburg, will supply the tanks, kettles, etc.

The Batopila Mining Co., of Chihuahua, Mexico, have placed an order for four iron buildings and four bridges with the Berlin Iron Bridge Co., of East Berlin, Conn. These buildings are to be shipped by steamer to Galveston, Tex., and thence by rail to the interior of Mexico, where they must be carted 100 miles on mule back up into the mountains.

The new shops of the Lenoir Car Co., at Lenoir City, Tenn., are well under way. The smithing and iron working building is 70x260 feet; the wood working shop 100x300 feet; the car wheel foundry 92x454 feet, with two cupola rooms, engine and boiler rooms and core oven rooms attached. The car wheel capacity will be 250 a day. The erecting shop is not yet up. It will be 120x300 feet.

The new electric light and power station for the Brush Electric Light Co., at Baltimore, Md., will be one of the finest in the Southern States. The boiler room is 83 feet wide by 129 feet long. The dynamo room is 130 feet square, and its floor space is entirely free from posts. The roofs are designed and built by the Berlin Iron Bridge Co., of East Berlin, Conn., and are made entirely of iron, covered with their patent anti-condensation corrugated iron roof covering.

Fires and Accidents:—

The Snell & Meharg Machine shops at Hamburg, Pa., were completely destroyed by fire April 26. The building was 40x200 feet, and in it were stored 100 new engines that had been finished.

General Industrial Notes:—

The Benwood, O. plant of the Wheeling Steel & Iron Co., has been equipped for the manufacture of steel skelp.

The Ella Furnace of West Middlesex, Pa., is under repairs preparatory to going into blast again after a long idleness.

Furnace A, of the Monongahela blast furnaces of the National Tube Works Co., at McKeesport, Pa., will be relined at an outlay of $25,000.

The West Superior Iron & Steel Co., which has started up under the receiver, has received an order from the Omaha Railway Co. for $40,000 worth of steel culvert pipes.

The Reliance Wire Works, at Milwaukee, Wis., have been bought from the judgment creditors by Henry Noyes, for $30,000. The works will be started soon with a full force.

James Gunning, assignee of Wm. Hennessey's Boiler Works,

New Castle, Pa., secured a verdict for $1,236.10 against Wilkie, Bothwell & Co., on a bill which the defendants had disputed.

Sarah furnace, of the Kelly Iron & Nail Co., of Ironton, O., started up last week. The furnace makes Bessemer pig iron for the Ashland (Ky.) Steel & Iron Co., whose plant also starts.

The plan of ex-Secretary Foster to adjust the indebtedness of the Fostoria (O.) Brass & Iron Works Co. by issuing bonds for 50 cents on the dollar has been arranged. All creditors have agreed to take 50 per cent.

Last year Jonathan Creager's Sons, of Cincinnati, sent several of their automatic brick machines to Russia. This year thus far they have received another order from that country, and from Mexico an order has come for two machines.

The employes of the Atlantic mill at New Castle, Pa., struck last week demanding back money, withheld by agreement. The proprietors say that no agreement was violated and that the coal strike would have compelled them to stop in any event.

J. F. Rogers & Co., of New York City, have placed the order for a new industrial school building at Havana, Cuba, with the Berlin Iron Bridge Co., of East Berlin, Conn. The building will be 15 metres wide and 48 metres long, constructed entirely of iron and cement.

The court has allowed the receivers of the Pottstown Iron Co. to accept the terms of a plan of reorganization proposed by Cofrode & Saylor, inc., and the Reading Rolling Mills Co. The iron company is a creditor of the two corporations on promissory notes in the sums of $70,000 and $5,000 respectively.

The H. B. Tool Co., of Kent, O., will be ready to fill orders within a week or two. They are putting in place the machinery so far received and will have the rest within a short time. Their plant was built by the Royal Machine Works and was occupied by that company for a year.

Blairsville, Pa., citizens have decided to take up the question of building a tin plate plant, the new concern to be known as the Pennsylvania Rolling Mill & Tin Plate Co., the capital stock to be $250,000 at $50 a share. A committee has been appointed looking to the erection of the plant

Norton Bros., the Chicago tinplate manufacturers and jobbers, have negotiated for the entire output of the Ellwood Tin Plate Co.'s plant at Ellwood City, Pa. The works were put in operation last week. A four-mill plant has been built and 200 men will be employed when operations are to full capacity.

A number of Milwaukeeans, including A. Gettelman, Robert Nunnemacher and F. Kraus, have bought the patent rights for Milwaukee and Wisconsin of the Orvis steel arch furnace. They will organize a company and manufacture the device for which the special claims are smoke prevention and fuel economy.

All departments of the Pottsville Iron and Steel Co. at Fishback, Pa., will soon go on double turn. The steel department has been on double time for a couple of weeks to keep

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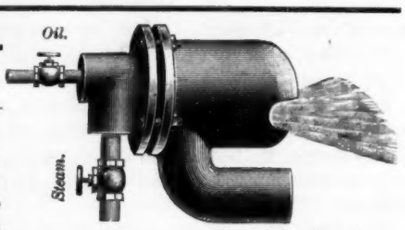

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up with the mill's rolling channels and beams. The works are turning out considerable material for the Berlin Iron Bridge Co.

Robert E. Daniels, of Youngstown, O., secretary of the newly formed Daniels Steel Railroad Tie Co., has been in Hammond, Ind., examining rolls in use there that are suitable for rolling the Daniels patented ties. The Duquesne Street Railway Co., of Pittsburg, have been examining the tie with a view to adopting it.

Work is being rapidly pushed on the tin mills at the Ætna-Standard plant, Bridgeport, O., and it is expected that operations will be commenced in from 60 to 90 days. The first mills built will be experimental, and if the venture proves successful several more will follow. The old puddling department of the Standard plant has been entirely cleared and the building will be used as a tinning house.

A Chester, Pa., dispatch of April 26 says: The once busy plant of the Delaware River Iron Shipbuilding & Engine Co., known the world over as John Roach & Sons, is now almost as silent as the grave. The steamer Yorktown, that left the wharf yesterday for New York, completes the last contract the company has on hand, and the yard is about ready to close its huge gates for the first time in its history, unless new orders are soon received.

The Egan Co., of Cincinnati, call attention to two of their new machines which have become popular in the lines for which they were designed. They claim that their 5½ band re-saw for splitting boards into thin stuff is rapidly supplanting the circular saw, and, on account of its simplicity, requires only ordinary skill to operate it. The automatic glue jointer is a new furniture making machine, which makes two accurate glue joints at one operation without danger to the attendant, and has already had a large sale.

Tap-Cinder in Basic Steel Making

A correspondent of the London *Colliery Guardian* writes: "The recent sudden and unexpected appreciation in the value of tap-cinder—hitherto regarded as waste refuse from the puddling furnaces—has brought about something like a revolution in the pig iron trade of the Black Country. The tap-cinder, having until quite recently no commercial value, has been a source of trouble to the finished iron-maker. The only profitable use to which the material has hitherto been put is as an ingredient in the manufacture of cinder pig iron at the blast furnaces of the district, but the demand for this purpose has been small as compared with the prodigious supplies. A year ago it was discovered by a German chemist that this tap cinder contained an amount of phosphorous which rendered it of sufficient value for basic steel making to justify the cost of its transmission for that purpose to Germany; and the buying up of large quantities of it by Continental steel makers naturally opened the eyes of steel makers at home to its value, with the natural result that the market price is rapidly advancing. As a matter of fact it is now worth nearly 5s. per ton. The manufacture of the commonest class of pig iron has, under these altered conditions, practically ceased already in South Staffordshire. The furnaces hitherto devoted to the production of that class of pig iron are now turning out crude iron—an admixture of Northampton or Derby with Spanish ore and Middlesbrough pigs with other ingredients, which results in a product which is valuable for the purposes of steel manufacture. The blast furnaces of the Black Country will henceforth be devoted to this and kindred classes of produce."

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On May 14 and 15, special low rate excursion tickets to Canton will be sold from ticket stations on the Pennsylvania Lines in Ohio account the state encampment G. A. R. Tickets will be good on all regular trains those dates and will be valid returning until May 20, inclusive. For details, apply to nearest Pennsylvania Lines ticket agent.

AT last the World's Fair buildings have been disposed of. They were sold outright to Graff & Co., house wreckers, for $87,500. The commissioners have stipulated that all the smaller buildings at the northern end of the park shall be cleared away by Sept. 1 next. If the park be cleared of rubbish by May 1, 1896, the commissioners will be satisfied.

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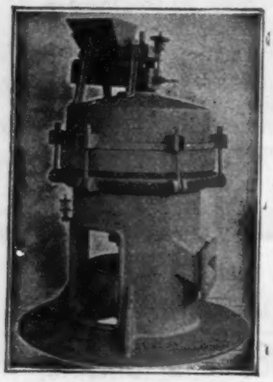

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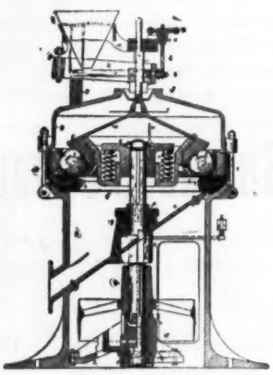

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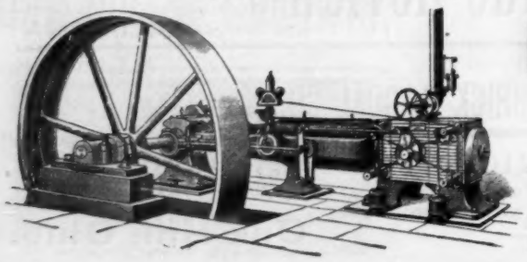

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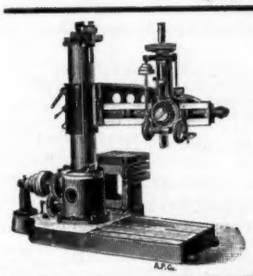

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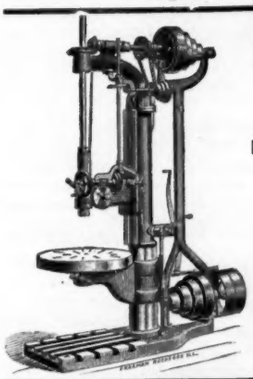

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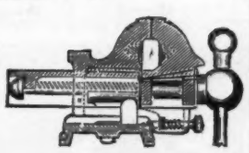

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Stevenson Bros. & Co., Philadelphia, Pa.

Cranes and Derricks—
Wm. Tod & Co., Youngstown, O.
Detroit Foundry Equipment Co., Detroit, Mich.
Vulcan Iron Works Co., Toledo, O.

Cupolas—
Detroit Foundry Equipment Co., Detroit, Mich.
Greiner Economical Cupola Co., Chicago, Ill.
Garden City Sand Co., Chicago, Ill.

Deck Engines—
Vulcan Iron Works Co., Toledo, O.

Dies—
Toledo Machine & Tool Co., Toledo, O.
Cady Mfg. Co., Cleveland, O.

Drill Presses—
A. P. Quint, Hartford, Conn.
Prentiss Tool & Supply Co., Chicago, Ill.
Bickford Drill & Tool Co., Cincinnati, O.
Foos Mfg. Co., Springfield, O.
W. F & John Barnes Co., Rockford, Ill.
W. H. Robertson, Chicago, Ill.
Hill, Clarke & Co., Chicago, Ill.
J. G. Timolat, 89 S. 5th ave., New York City.
Dawson & Goodwin, Chicago, Ill.

Drop Forgings—
The Billings & Spencer Co., Hartford, Conn.

Drop Presses—
Toledo Tool & Machine Co., Toledo, O.
Cady Mfg. Co., Cleveland, O.
Bertsch & Co., Cambridge City, Ind.
Dawson & Goodwin, Chicago, Ill.

Eave Troughs and Conductors—
Berger Mfg. Co., Canton, O.
Berger Bros., Philadelphia, Pa.

Ejectors—
James Jenks, Detroit, Mich.

Elevators—
Lane & Bodley Co., Cincinnati, O.

Emery and Corundum Wheels—
J. Wendell Cole, Columbus and Chicago.
Acme Safety Emery Wheel Co., Detroit, Mich.

Emery Wheel Machinery—
J. Wendell Cole, M. E., Columbus, O., or Chicago, Ill.

Engineers and Contractors—
E. H. Jones & Co., Cleveland.
Brightman Stoker Co., Cleveland, O.
Richard A. Parker, Marquette, Mich.
Artificial Gas Engineering Co., Pittsburg, Pa.

Engravers and Electrotypers—
Eclipse Electrotype & Engraving Co., Cleveland.
Union Electrotype Foundry, Cleveland.

Engines (Gas)—
Otto Gas Engine Works, Philadelphia, Pa.
Van Dusen Gas Engine Co., Cincinnati, O.
Hicks Gas Eng ne Co., Cleveland, O.

Engineers' Specialties—
James Jenks, Detroit, Mich.

Engines (Steam)—
Wm. Tod & Co., Youngstown, O.
E. H. Jones & Co., Cleveland.
Lane & Bodley Co., Cincinnati, O.
L. Spence & Son, Martins Ferry, O.
Brightman Stoker Co., Cleveland, O.
Wells Engine Co., New York City.
The Brownell & Co., Dayton, O.
Armstrong Bros., Springfield, O.
The John T. Byers Machine Co., Ravenna, O.
R. Laird & Son, Galion, O.

Excavators—
Vulcan Iron Works Co., Toledo, O.

Exhaust Heads—
W. C. Lyman, Chicago, Ill.

Fans—
Buffalo Forge Co., Buffalo, N. Y.

Files, Makers of—
E. K. Morris & Co., Cincinnati, O.

Fire Brick and Clay—
J. V. Rose, Sharon, Pa.
Union Mining Co., Mt. Savage, Md.
Garden City Sand Co., Chicago, Ill.
Geo. H. Anderson & Co., Pittsburg, Pa.
Westmoreland Fire Brick Co., Pittsburg, Pa.
Oak Hill Fire Brick & Coal Co., Oak Hill, O.
American Fire Brick & Clay Co., Mineral Point, Ohio.

Foot and Power Lathes—
Prentiss Tool & Supply Co., Chicago, Ill.
W. F. & John Barnes Co., Rockford, Ill.
W. H. Robertson, Chicago, Ill.
Hill, Clarke & Co., Chicago, Ill.
Dawson & Goodwin, Chicago, Ill.

Foundries—
Harn, Ow & Co., Beaver Falls, Pa.
Addyston Pipe & Steel Co., Cincinnati, O.
Radford Pipe & Foundry Co., Cincinnati, O.
Lane & Bodley Co., Cincinnati, O.
Brightman Stoker Co., Cleveland, O.
The Lloyd-Booth Co., Youngstown, O.
Taylor & Boggis Foundry Co., Cleveland, O.
Lake Shore Iron Works, Marquette, Mich.
Wm. Tod & Co., Youngstown, O.
S. Freeman & Sons Mfg. Co., Racine, Wis.

Foundry Supplies—
Garden City Sand Co., Chicago, Ill.
Detroit Foundry Equipment Co., Detroit, Mich.
Greiner Economical Cupola Co., Chicago, Ill.
American Fire Brick & Clay Co., Mineral Point, Ohio.

Forgings—
Cleveland City Forge & Iron Co., Cleveland.

Fuel Oil Burners—
John R. Armstrong Co., Chicago, Ill.
Thurman Fuel Oil Burner Co., Indianapolis, Ind

Furnace Linings—
Union Mining Co., Mt. Savage, Md.
American Fire Brick & Clay Co., Mineral Point, Ohio.
Garden City Sand Co., Chicago, Ill.

Friction Clutch Pulleys—
J. H. & D. Lake Co., Massillon, O.

Galvanizers—
H. H. Hodell, Cleveland.

Grindstones—
E. K. Morris & Co., Cincinnati, O.

Graphite Paint—
Jos. Dixon Crucible Co., Jersey City, N. J.

Hangers, Pulleys and Shafting—
Lane & Bodley Co., Cincinnati, O.
J. H. & D. Lake Co., Massillon, O.

Heaters and Purifiers—
Stilwell & Bierce Manufacturing Co., Dayton, O.
E. H. Jones & Co., Cleveland.
Brightman Stoker Co., Cleveland, O.

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Hoisting Engines—
Lake Shore Iron Works, Marquette, Mich.
Vulcan Iron Works Co., Toledo, O.
The John T. Byers Machine Co., Ravenna, O.

Injectors—
Eagle Lubricator Co., Cleveland, O.
James Jenks, Detroit, Mich.

Insurance Companies—
Hartford Steam Boiler I. & I. Co., Hartford, Ct.

Iron and Steel Wire—
Trenton Iron Co., Trenton, N. J.

Investments—
Frank R. Biedler, Baltimore, Md.
Fidelity & Deposit Co., Baltimore, Md.
Geo. Pemberton, New York.

Iron and Steel Roofing—
Sykes Iron & Steel Roofing Co., Niles, O.
Berger Mfg. Co., Canton, O.
Berger Bros., Philadelphia, Pa.

Iron Nails and Steel—
Weber & Co., Cincinnati, O.
G. B. Schulte Sons Co., Cincinnati, O.
Geo. H. Sibell & Co., Chicago, Ill.

Iron Ore, Bar and Pig Iron—
Oglebay, Norton & Co., Cleveland.
J. H. Outhwaite & Co., Cleveland.
Condit-Fuller Co., Cleveland.
E. C. Pope, Cleveland.
Geo. H. Sibell & Co., Chicago, Ill.

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Bickford Drill & Tool Co., Cincinnati, O.
Cleveland Twist Drill Co., Cleveland, O.
Prentiss Tool & Supply Co., Chicago, Ill.
A. P. Quint, Hartford, Conn.
Toledo Machine & Tool Co., Toledo, O.
W. F. & John Barnes Co., Rockford, Ill.
H. Bickford, Lakeport, N. Y.
W. H. Robertson, Chicago, Ill.
Hill, Clarke & Co., Chicago, Ill.
The Billings & Spencer Co., Hartford, Conn.
Dawson & Goodwin, Chicago, Ill.
Cincinnati Milling Machine Co., Cincinnati, O

Ladles—
Detroit Foundry Equipment Co., Detroit, Mich.

Land Companies—
Chicago Heights Land Association, Chicago, Ill.

Lathes—
Prentiss Tool & Supply Co., Chicago, Ill.
Bickford Drill & Tool Co., Cincinnati, O.
W. F. & John Barnes Co., Rockford, Ill.
W. H. Robertson, Chicago, Ill.
Hill, Clarke & Co., Chicago, Ill.
Dawson & Goodwin, Chicago, Ill.

Link Belting—
The Jeffrey Mfg. Co., Columbus, O.

Machinists' Tools and Supplies—
Prentiss Tool & Supply Co., Chicago, Ill.
Bickford Drill & Tool Co., Cincinnati, O
W. F. & John Barnes Co., Rockford, Ill.
H. Bickford, Lakeport, N. Y.
W. H. Robertson, Chicago, Ill.
Hill, Clarke & Co., Chicago, Ill.
Dawson & Goodwin, Chicago, Ill.

Machine Screws—
Illinois Screw Co., Chicago, Ill.

Machine Shops—
Toledo Machine & Tool Co., Toledo, O.
Harn, Ow & Co., Beaver Falls, Pa.

Mining Machinery—
Lake Shore Iron Works, Marquette, Mich.
Bucyrus Steam Shovel & Dredge Co., Bucyrus, O.
Vulcan Iron Works Co., Toledo, O.
American Mining & Machinery Co., Cleveland.

Moulding Sand—
Garden City Sand Co., Chicago, Ill.

Municipal Bonds—
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Milling Machines—
Prentiss Tool & Supply Co., Chicago, Ill.
W. H. Robertson, Chicago, Ill.
Hill, Clarke & Co., Chicago, Ill.
Dawson & Goodwin, Chicago, Ill.
Cincinnati Milling Machine Co., Cincinnati, O.

Mines and Mining Stock—
Frank R. Biedler, Baltimore, Md.

Mining Engineers—
Richard A. Parker, Marquette, Mich.

Oil Tanks—
The J. C. McNeil Co., Akron, O.

Ore Crushers—
Lake Shore Iron Works, Marquette, Mich.
American Mining & Machinery Co., Cleveland.

Paint—
Iron Clad Paint Co., Cleveland.
Jos. Dixon Crucible Co., Jersey City, N. J.
Berger Bros., Philadelphia, Pa.
Excelsior Paint & Roofing Co., New York.

Perforated Sheet Metal—
Harrington & King Perforating Co., Chicago, Ill
Aitchison Perforated Metal Co., Chicago.
Hendrick Mfg. Co., Ltd., Carbondale, Pa.

Planers—
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Bickford Drill & Tool Co., Cincinnati, O.
W. H. Robertson, Chicago, Ill.
Hill, Clarke & Co., Chicago, Ill.
Dawson & Goodwin, Chicago, Ill.

Plumbers' and Gas Fitters' Supplies—
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Armstrong Bros., Springfield, O.

Portable Forges—
Foos Mfg. Co., Springfield, O.
Buffalo Forge Co., Buffalo, N. Y.
Cady Mfg. Co., Cleveland, O.

Portable Drills—
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Power Hammers—
W. H. Robertson, Chicago, Ill.

Presses—
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Cady Mfg. Co., Cleveland, O.
Bertsch & Co., Cambridge City, Ind.

Pulleys—
Lane & Bodley Co., Cincinnati, O.
J. H. & D. Lake Co., Massillon, O.

Pulverizing Machinery—
Lake Shore Iron Works, Marquette, Mich.
American Mining & Milling Machinery Co., Cleveland, O.

Pumps (Steam)—
E. H. Jones & Co., Cleveland.
Brightman Stoker Co., Cleveland, O.

Radial Drills—
Bickford Drill & Tool Co., Cincinnati, O.

Railroad Castings—
Vulcan Iron Works Co., Toledo, O.

Railway Supplies—
Cleveland City Forge & Iron Co., Cleveland.
Garden City Sand Co., Chicago, Ill.

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American Mining & Machinery Co., Cleveland.

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Harrington & King Perforating Co., Chicago.
Hendrick Mfg. Co., Ltd., Carbondale, Pa.

Screws—
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Hill, Clarke & Co., Chicago, Ill.
W. H. Robertson, Chicago, Ill.
Dawson & Goodwin, Chicago, Ill.

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Cady Mfg. Co., Cleveland, O.
Dawson & Goodwin, Chicago Ill.

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Cleveland Rolling Mill Co., Cleveland.
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Brightman Stoker Co., Cleveland, O.

Smokeless Furnaces—
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Cady Mfg. Co., Cleveland, O.
Bertsch & Co., Cambridge City, Ind.

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Steam Boiler Inspectors—
Hartford Steam Boiler Inspection & Insurance Co., Hartford, Conn.

Steam Shovels and Dredges—
Bucyrus Steam Shovel & Dredge Co., Bucyrus, O.
Vulcan Iron Works Co., Toledo, O.

Steel—
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Chester Steel Casting Co., Philadelphia, Pa.
Wm. Jessop & Sons, Ltd., New York, N. Y.
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Cleveland Rolling Mill Co., Cleveland.

Steel Stamps and Stencils—
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James Murdock, Jr., Cincinnati, O.

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Brightman Stoker Co., Cleveland, O.

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R. Laird & Son, Galion, O.

Tinners' Hardware—
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Trenton Iron Co., Trenton, N. J.

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Detroit Foundry Equipment Co., Detroit, Mich.

Tumblers—
Detroit Foundry Equipment Co., Detroit, Mich.

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Cleveland Twist Drill Co., Cleveland.

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Valve Gears—
Geo. Marshall, Fremont, Neb.

Vises—
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Brightman Stoker Co., Cleveland, O.

Washers—
Milton Mfg. Co., Milton, Pa.

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Addyston Pipe & Steel Co., Cincinnati, O.
Radford Pipe & Foundry Co., Cincinnati O.

Well Drilling Machinery—
Williams Bros., Ithaca, N. Y.

Wheelbarrows—
Kilbourne & Jacobs Mfg. Co., Columbus, O.

Wire Fence Ratchets—
J. Stauffer, Dayton, O.

Wire Rope—
Trenton Iron Co., Trenton, N. J.

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John Adt & Son, New Haven, Conn.
Cady Mfg. Co., Cleveland, O.

Wood-Working Machinery—
J. A. Fay & Egan Co., Cincinnati, O.

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ECLIPSE MUSIC PLATES
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* Daily. † Daily, except Sunday.

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Pittsburgh and Bellaire	† 7.45 am	†11.55 am
Pittsburgh, Bellaire and East	†12.45 pm	† 6.25 pm
Philadelphia and New York	* 1.40 pm	*11.15 am
Baltimore and Washington	* 1.40 pm	*11.15 am
Alliance and Pittsburgh	* 1.40 pm	*11.15 am
Ravenna and Alliance	† 3.25 pm	† 9.50 am
Hudson and Ravenna	* 5 .0 pm	* 8.25 am
Philadelphia and New York	*11.10 pm	* 5.25 am
Baltimore and Washington	*11.10 pm	* 5.25 am
Alliance and Pittsburgh	*11.10 pm	* 5.25 am

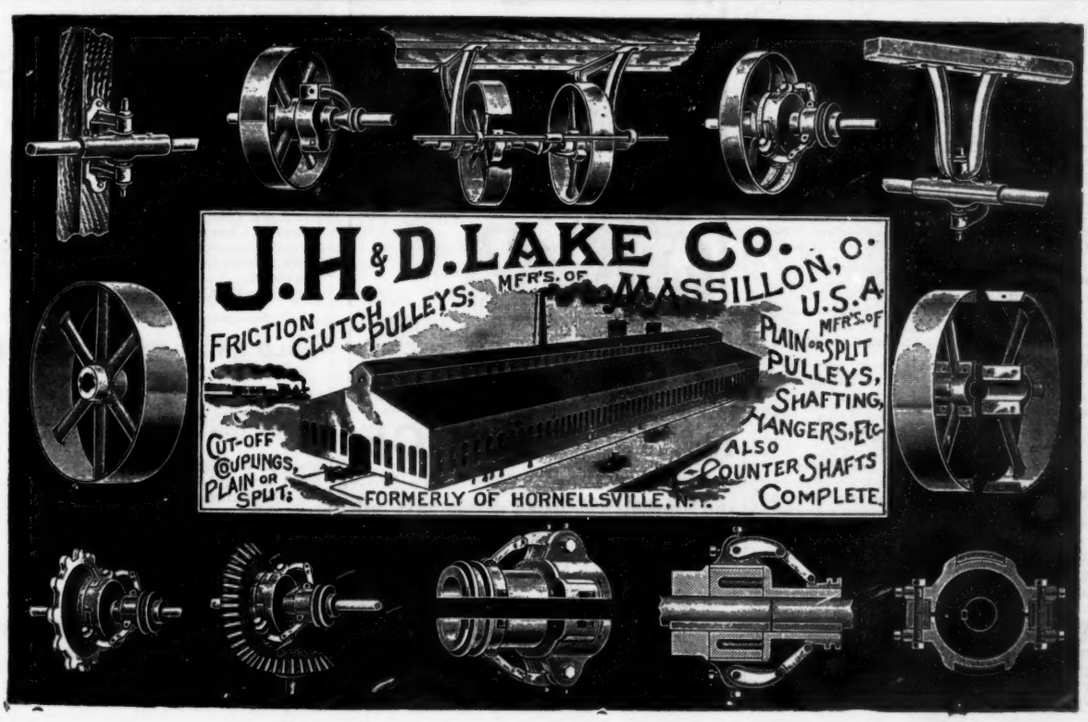
Mt. Vernon and Pan-Handle Route.

FROM CLEVELAND TO	LEAVE	ARRIVE
Xenia and Cincinnati	* 8.40 am	* 5.25 pm
Akron, Columbus & Zanesville	†2.45 am	*11.55 pm
Akron and Columbus	* 8.40 pm	*5.25 pm
Akron and Orrville	† 3.25 pm	† 9.50 am
Columbus and Cincinnati	* 8.00 pm	* 7.00 am

Valley Ry. Depot foot of So. Water St. City Office 143 Superior St.

	Arrive.	Depart.
Akron & Canton	*6:40 P M	*7:10 A M
Akron, Canton & Valley Jctn.	*10:10 A M	*3:15 P M
Valley Jctn. & Way Stations	†6:40 P M	†7:10 A M
Akron, Canton & Chicago	*8:00 A M	*6:30 P M
Wooster and Garrett	†3:00 P M	†11:00 A M
Wooster		*6:30 P M
Akron, Canton & Marietta	†3:00 P M	†11:00 A M
Steubenville, Wheeling, Washington, D. C., and Baltimore	†3:00 P M	†11:00 A M

†Daily except Sunday. *Daily. Pullman's Palace Vestibule Compartment Sleeping cars between Cleveland and Chicago.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FRICTION CLUTCH PULLEYS;
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The star (*) indicates that the adv. appears alternate weeks; the dagger (†) once a month; the double dagger (‡) once in three weeks; the parallel (‖) three times out of four.

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The name of the Chicago, Milwaukee & St. Paul Railway has long been indentified with practical measures for the general upbuilding of its territory and the promotion of its commerce, hence manufacturers have an assurance that they will find themselves at home on the company's lines.

The Chicago, Milwaukee & St. Paul Railway Company owns and operates 6,150 miles (9,900 kilometers) of railway, exclusive of second track, connecting track or sidings. The eight States traversed by the lines of the company, Illinois, Wisconsin, Northern Michigan, Iowa, Missouri, Minnesota, South Dakota, and North Dakota, possess, in addition to the advantages of raw materials' and proximity to markets, that which is the prime factor in the industrial success of a territory—a people who form one live and thriving community of business men, in whose midst it is safe and profitable to settle. Many towns on the line are prepared to treat very favorably with manufacturers who would locate in their vicinity.

Mines iron of coal,, copper, lead and zinc, forests of soft and hard wood, quarries, clays of all kinds, tan-bark, flax and other raw materials exist in its territory in addition to the vast agricultural resources.

A number of new factories have been induced to locate—largely through the instrumentality of this company—at towns on its lines. The central position of the States traversed by the Chicago, Milwaukee & St. Paul Railway, makes it possible to command all the markets of the United States. The trend of manufacturing is Westward. Nothing should be permitted to delay enterprising manufacturers from investigating. Confidential inquiries are treated as such. The information furnished a particular industry is reliable.

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Industrial Commissioner, C., M. & St. P. R'y.
160 Adams St., CHICAGO, ILL.

"THE IRON TRADE REVIEW"

is an increasingly valuable medium through which to sell equipment to machine shops and foundries.

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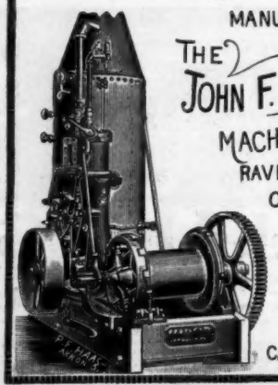

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FOR SALE—Stock of Hardware, Stoves and Tinware. Situated within forty miles of Chicago. Population 8,000.

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Care of Iron Trade Review.

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[On Lake Erie docks.]

No. 1 Specular, Bessemer	3.00@ 3.35
No. 1 Bessemer hematite	2.75@ 0.00
Hematites No. 1 non-Bessemer	2.25@ 2.50
No 1. Specular, non-Bessemer	2.50@ 3.00

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CLEVELAND (f. o. b. cars):	
Bessemer	$10 40@$10 60
No. 1 Strong Foundry	11 25@ 11 75
No. 2 Strong Foundry	10 25@ 10 75
No. 1 Gray Forge, red short	9 50@ 9 75
No. 2 Gray Forge, neutral	9 25@ 00 00
No. 1 American Scotch	11 60@ 00 00
No. 2 American Scotch	10 60@ 00 00
Lake Superior Charcoal	14 00@ 14 50
PITTSBURG:	
No. 1 Foundry	$11 25@$11 75
No. 2 Foundry	10 50@ 11 00
Gray Forge	9 25@ 9 50
White and Mottled	9 00@ 9 25
Warm Blast Charcoal	18 00@ 19 00
Cold Blast Charcoal	22 00@ 26 00
Bessemer	10 35@ 10 50
CHICAGO (reported by our representative:)	
Lake Superior Charcoal	$15 00@$15 50
Local Coke Foundry No. 1	11 25@ 11 50
Local Coke Foundry No. 2	10 25@ 10 50
Local Coke Foundry No. 3	10 00@ 10 25
Local Scotch Foundry No. 1	11 50@ 11 75
Local Scotch Foundry No. 2	10 75@ 11 25
Local Scotch Foundry No. 3	10 25@ 10 75
Southern Coke No. 1	10 75@ 11 00
Southern Coke No. 2	10 00@ 10 25
Southern Coke No. 3	9 75@ 10 00
Southern No. 1 Soft	10 00@ 10 25
Southern No. 2 Soft	9 75@ 10 00
Southern Silveries No. 1	11 50
Southern Silveries No. 2	11 00
Southern Gray Forge	9 35@ 9 60
Jackson Co. Silveries	14 60@ 15 00
Ohio Silveries No. 1	14 25@ 14 50
Ohio Silveries No. 2	11 75@ 12 00
Ohio Strong Softeners	12 60@ 12 85
Alabama Car Wheel	17 00@ 17 50
Southern Charcoal No. 1	13 75@ 14 00
Southern Charcoal No. 2	13 25@ 13 50
CINCINNATI (reported by Rogers, Brown & Co.)	
Southern Coke No. 1, Foundry	$10 50@$10 75
Southern Coke No. 2 and No. 1 Soft	9 50@ 9 75
Hanging Rock Coke, No 1	12 50@ 13 00
Hanging Rock Charcoal No. 1, Fdy	16 00@ 17 00
Tennessee Charcoal No 1	14 00@ 14 50
Jackson County Stone Coal No 1	14 50@ 16 00
Southern Coke, Grey Forge	8 75@ 9 00
" " Mottled	8 50@ 8 75
Standard Alabama Car Wheel	16 25@ 17 25
Tennessee " "	15 50@ 16 00
Lake Superior " "	16 00@ 16 50
BUFFALO (reported by Rogers, Brown & Co.)	
No. 1 Foundry Strong Coke Iron Lake Superior Ore	$11 75
No. 2 Foundry Strong Coke Iron Lake Superior Ore	11 25
Ohio Softener No. 1	11 75
Jackson Co. Silvery No. 2	15 50@ 17 00
Lake Superior Charcoal	14 75
Tennessee Charcoal	15 50
Southern Soft No. 1	11 70
Southern Soft No. 2	10 00
Alabama Car Wheel	16 00@ 17 50
Hanging Rock Charcoal	18 50
LOUISVILLE (reported by Geo. H. Hull & Co.)	
Southern Coke No. 1 Foundry	$10 25@$10 50
Southern Coke No. 2 Foundry	8 75@ 9 25
Southern Coke No. 3 Foundry	8 50@ 8 75
Gray Forge	8 00@ 8 50
Southern Charcoal No. 1 Foundry	12 50@ 13 50
Car Wheel	15 00@ 15 50
Spathite	11 25@ 11 75
ST. LOUIS (reported by Rogers, Brown & Meacham):	
Southern Coke No 1	$10 75@$11 00
Southern Coke No. 2	9 75@ 10 00
Southern Coke No. 3	9 50@ 9 75
Southern Gray Forge	9 00@ 9 25
Southern Charcoal No. 1	15 00@ 16 00
Missouri Charcoal No. 1	12 00@ 12 50
Ohio Softeners	14 50@ 15 00
Lake Superior	16 50@ 17 00
Southern	17 00@ 17 50
Connellsville Coke, St. Louis	4 50

OLD RAILS AND SCRAP METAL.

[Prices paid by mills.]

	GROSS TONS
Old iron rails	$12 50
Old steel rails	10 00
	NET TONS
No. 1 R. R. wrought scrap	$ 9 50
No. 1 wrought scrap	9 00
No. 1 Machine cast scrap	8 50
Iron axles	15 50
Axle turnings	8 00
Wrought turnings (free from cast)	6 75
Cast borings	5 00
Uncut wrought iron boilers	3 00
Steel boiler plates	8 00
Grate bars	4 00
Pipes and flues (clean)	7 00
Tank iron	6 75
Hoop and band iron	5 00
Sheet iron	5 00
Wrought drillings	6 50
Malleable iron	7 50

Frank P. Cady, Pres. and Supt.
Geo. H. Bowler, Sec'y and Treas.

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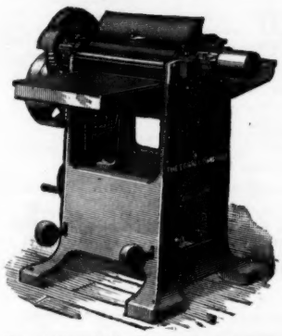
283 W. River St., CLEVELAND, O.

WIRE FORMING MACHINES.

Power Presses, Dies, Drop Hammers, Punches and Shears, Special Machinery, Wire Cutters and Straighteners.



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Planes 18 in. wide and up to 6 in. thick.
No. 2—24 in. wide and up to 6 in. thick.

DESIGNERS AND CONSTRUCTORS OF

WOOD-WORKING MACHINERY

Especially adapted

For PATTERN MAKERS

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General

WOOD WORKERS,

Etc.

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PERFECT PRODUCERS of PERFECT PRODUCTIONS

PERFORATED METALS

OF ALL KINDS FOR

MILLING MINING AND AGRICULTURAL MACHINERY,

PERFORATED IRON, STEEL, COPPER, BRASS, TIN, ZINC, LEAD, ETC., TO ORDER.

LARGE AND VARIED ASSORTMENT OF SIZES. CORRESPONDENCE SOLICITED.

THE ROBERT AITCHISON. PERFORATED METAL CO.,

OFFICE, ROOM 510 265 TO 269 DEARBORN STREET, CHICAGO, ILL. WORKS SOUTH CHICAGO.

Horse AND Mule Shoes

SHEETS, BARS, SLABS AND BILLETS.

Light Sheets for TINNING AND PERFORATING a Specialty.

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DIXON'S PERFECT LUBRICATING GRAPHITE.

The most Marvelous Lubricant Known.
Used Dry, or Mixed with Water, Oil or Grease

NOT AFFECTED BY HEAT, COLD, STEAM OR ACIDS.

An Interesting and Instructive Pamphlet will be sent Free of Charge.

JOS. DIXON CRUCIBLE CO. Jersey City, N. J.

IRON CLAD PAINT CO.

Factory, 75 & 77 Central Way. Sec. & Treas., No. 3 Case Build'g,

CLEVELAND, OHIO.

Trade Mark Patented.

ORDER DIRECT FROM THE

Iron Clad Paint Co.

And get the genuine article, and save liability of suit for using an article made in violation of the patents issued to Wm. Green, and now owned by this Company.

IRON CLAD PAINT is the most durable, most fire-proof and Cheapest Paint made.

FURNISHED both Dry and Ground in Oil

USED BY NEARLY ALL THE RAILROADS.

STRUCTURAL MATERIAL.

Beams and Channels (f. o. b. mill)	1.20c@1.30c
Angles	1.25c@1.35c
Tees	1.35c@1.45c
Universal Plates	1.25c
Sheared Plates	1.35c

MERCHANT IRON AND STEEL.

[List prices out of store.]

Flat Bar.

1½ to 4 by ⅜ to 1 inch	1 30
4¼ to 6 by ⅜ to 1 inch	1 35
1¾ to 6 by 1¾ to 2 inch	1 50
1¼ & 1¾ by ⅜ to ¾ inch	1 35
1 & 1½ by ⅜ to ¾ inch	1 40
⅝, ¾, ⅞, by ⅜ to ⅝ inch	1 50

Round and Square.

1 to 1⅜ inch	1 30
2 to 2¾ inch	1 40
2¾ to 3¼ inch	1 55
3⅜ to 4 inch	1 80
4¼ to 4½ inch	2 40
4¾ to 5 inch	2 60

Oval.

⅜ to 1¼ inch	1 50
⅝ to ¾ inch	1 50
½	1 70
⅜	1 90

Half Oval and Half Round.

1¼ to 3 inch	1 85
⅝ to 1¼ inch	1 65
⅜ to ¾ inch	1 90
½	2 05
⅜	3 15

Heavy Band.

1¾ to 6 by ¼ and 5-16 inch	1 40
1 to 1¾ by ¼ and 5-16 inch	1 45
¾ to ⅞ by ¼ and 5-16 inch	1 55
½ to ¾ by ¼ and 5-16 inch	1 80

Hoop Iron.

1 7-16 to 4, No. 13, 14, 15 and 16	1 85
1 7-16 to 2, No. 17, 18 and 19	1 90
1 7-16 to 2, No. 20	2 00
1 7-16 to 2, No. 21	2 10
1 7-16 to 2, No. 22	2 20
1⅛ to 1¾, No. 13, 14 and 15	1 90
1⅛ to 1¾, No. 16, 17 and 18	1 95
1⅛ to 1¾, No 19 and 20	2 00
1⅛ to 1¾, No. 21	2 10
1⅛ to 1¾, No. 22	2 20
15-16 and 1 inch, No. 13, 14 and 15	1 85
15-16 and 1 inch, No. 16, 17 and 18	2 00
15-16 and 1 inch, No. 19 and 20	2 10
15-16 and 1 inch, No. 21	2 20
15-16 and 1 inch, No. 22	2 30
⅞, No. 13, 14 and 15	2 10
⅞, No. 16, 17 and 18	2 20
⅞, No. 19 and 20	2 30
⅞, No. 21	2 40
⅞, No. 22	2 50
13-16, No. 13, 14 and 15	2 20
13-16, No. 16, 17 and 18	2 30
13-16, No. 19 and 20	2 40
13-16, No. 21	2 50
13-16, No. 22	2 60
¾, No. 13, 14 and 15	2 30
¾, No. 16, 17 and 18	2 45
¾, No. 19 and 20	2 55
¾, No. 21	2 65
¾, No. 22	2 75
11-16, No. 13, 14 and 15	2 55
11-16, No. 16, 17 and 18	2 60
11-16, No. 19 and 20	2 70
11-16, No. 21	2 80
11-16, No. 22	2 90
11-16, No. 23	3 00
⅝, No. 13, 14 and 15	2 60
⅝, No. 16, 17 and 18	2 70
⅝, No. 19 and 20	2 80
⅝, No. 21	2 90
⅝, No. 22	3 00
⅝, No. 23	3 10
9-16, No. 13, 14 and 15	2 80
9-16, No. 16, 17 and 18	2 90
9-16, No. and 20	3 00
9-16, No. 21	3 10
9-16, No. 22	3 20
9-16, No. 23	3 30
7-16 and ½ inch, No. 13, 14 and 15	3 00
7-16 and ½ inch, No. 16, 17 and 18	3 10
7-16 and ½ inch, No. 19 and 20	3 20
7-16 and ½ inch, No. 21	3 30
7-16 and ½ inch, No. 22	3 40
7-16 and ½ inch, No. 23	3 50
⅜, No. 13, 14 and 15	3 50
⅜, No. 16, 17 and 18	3 60
⅜, No. 19 and 20	3 70
⅜, No. 21	4 00
⅜, No. 22	4 10
⅜, No. 23	4 25

Light Band.

1½ to 6 by ⅛ to 3-16 inch	1 60
1½ to 6 by Nos. 11 and 12	1 65
1 to 1¾ by ⅛ to 3-16 inch	1 65
1 to 1⅜ by Nos. 11 and 12	1 70
⅞ and 13-16 by ⅛ to 3-16 inch	1 80
⅞ and 13-16 by Nos. 11 and 12	1 85
¾ and 11-16 by ⅛ to 3-16 inch	1 90
¾ and 11-16 by Nos. 11 and 12	1 95
⅝ and 9-16 by ⅛ to 3-16 inch	2 05
⅝ and 9-16 by Nos. 11 and 12	2 10
½ by ⅛ to 3-16 inch	2 20
½ by Nos. 11 and 12	2 25

Wagon Box Iron.

⅞ inch, beveled edge, by Nos. 11 and 12	1 80
⅞ inch, " " " " 13 and 14	1 90
¾ inch, " " " " 11 and 12	1 95
¾ inch, " " " " 13 and 14	2 15

Sheet Iron.

No. 10	1 85
No. 12	1 90
No. 14	1 95

THE ADAMS
WATER TUBE BOILER.

This Boiler is absolutely safe from explosion. Gives as much steam from the waste heat as any boiler made. Easy of access for cleaning and repairs. Furnishes perfectly dry steam. Occupies little ground space. Economical in first cost. Send for complete circulars giving list of users and testimonials, one of which is printed below.

The Falcon Tin Plate & Sheet Co.,
Niles, O., Aug. 18, 1893.

Chas. P. Adams, Esq.

Dear Sir: The three boilers of 225 H. P. each which you furnished us are working in every way satisfactory. We consider them as good steamers as any we have ever used. Up to the present time have spent nothing on them for repairs. Very respectfully,

The Falcon Tin Plate & Sheet Co.,
By Warner Arms, Pres't.

C. P. ADAMS,
807 The Cuyahoga, - CLEVELAND. O.

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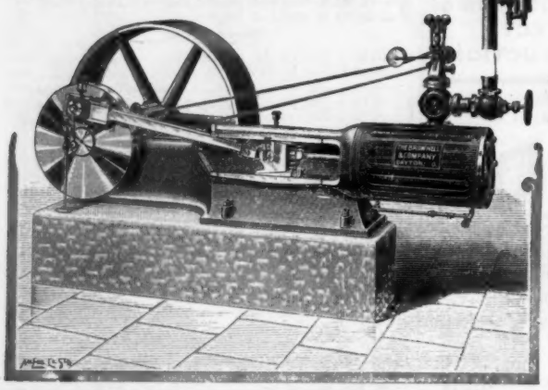
CLEVELAND, - OHIO,

—MANUFACTURERS OF—

BESSEMER AND OPEN-HEARTH STEEL,

Blooms, Billets, and Slabs, Steel Rails, Steel Beams, Channels and Angles. Steel Forgings, Bar Spring, and Sleigh Shoe Steel. Steel Wire of all kinds. Barbed Wire, Iron and Steel Plates, Galvanized and Black Sheet Iron and Steel Corrugated Iron Roofing.

The Brownell & Company



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Engines, Boilers,

SAW MILLS

AND

Sheet Iron Work.

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Also, MECHANICS, *Mining, Prospecting, Arithmetic, etc.* To begin, students only need know how to read and write. **DIPLOMAS** Awarded. **Low Prices.** Send for FREE Circular to THE CORRESPONDENCE SCHOOL OF MECHANICS, SCRANTON, PA.

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We are the only Steel Roofing Co. awarded Medal and Diploma for **PATENT CAP ROOFING** at World's Columbian Exposition. We are also large manufacturers of all styles of METAL ROOFING, SIDING, CEILING, ETC. Send for Catalogue and Price List. Mention this paper.

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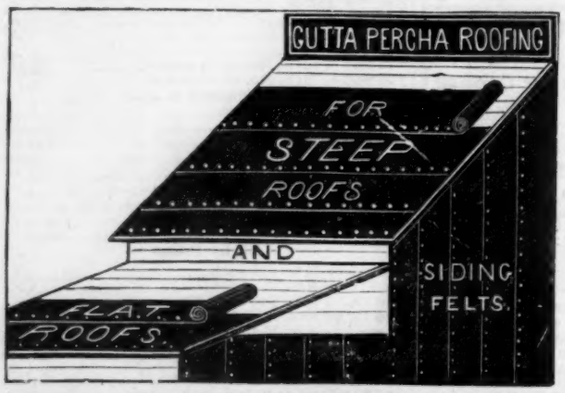

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Elastic Paint for Metal Roofs and Siding only 60c. per gallon in bbls.

Send for Catalogue and references from hundreds of the largest Manufacturing firms in the United States. Also Water Proof Siding and Sheathing Paper.

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111 N. Fourth St.,
PHILADELPHIA, PA.

No. 15-17	2 05
No. 18	2 20
No. 20	2 30
No. 22-24	2 40
No. 25 26	2 50
No. 27	2 60

Steel Boiler Plates—1-4 in. and Heavier.

Tank	1 60
Shell	1 85
Flange	2 10
Marine Flange	2 35
Fire Box	3 35

Above includes plates 90 inches wide.

90 to 96 in. wide	½c. ℔. extra
96 to 100 in. wide	1 c. "
100 to 104 in. wide	1½c. "
104 to 106 in. wide	special

American Cast Tool Steel.

ROUND, SQUARE AND OCTAGON.	cts. ℔s.
1 to 2 in. inclusive	08
9-16 to ½ in. "	08½
7-16 to ⅜ and 2⅜ to 3 in	09
3⅛ to 4 in	09½
⅜ to 11-16 and 4½	10
⅛ to 6 in	10½
¼ to 9-32 and 6⅛ to 7 in	11
3-16 in	13

Flats.

	cts. ℔s.
2 to 9-16 in. wide by 2 to ⅜ thick	8

Bessemer and O. H. Steel.

Machinery	base price, 1 80
Tire	" 1 85
Spring	" 2 20
Sleigh Shoe	" 2 20
Toe Calk	" 2 05
Cutter Shoes, tapered and bent	" 2 45

English Tool Steel.

Jessop's	15½c
Hobson's "Best"	15½c
" "Choice"	35c

Burden Boiler Rivets.

½, ⅝, 11-16 and ¾ inches diameter	3 70
Bridge ½, ⅝, 11-16 and ¾ inch diam	3 40

MACHINERY SUPPLY MARKET.

Anvils.

American	℔ 9@10
Wright's	℔ 12

Bellows.

Blacksmiths' Hill's	dis 40
Blacksmiths' Bullock's	dis 50&10
Moulders'	dis 40@40&10
Hand	dis 40&10@50

Belting.

Boston Belting Co.'s standard	dis 70
" " " extra	dis 60&5
" " " best	dis 55
Cleveland Rubber Co. extra standard	dis 60&10
Hoyt's Short Lap	dis 45
Shultz Raw Hide Leather Belting, single	dis 40
Munson's Short Lap Single Leather	dis 50
Munson's Short Lap Double and Light Double Leather	dis 50&5
Shultz Raw Hide Leather Belting, Double and Light Double	dis 40
Standard, oak tanned	dis 50&10
Alexander Brothers' pure oak tanned	dis 45

Blowers and Exhausters.

B. F. Sturtevant's	dis 20
Boston Blower Co.	dis 35
Buffalo	dis 40

Chucks.

Cushman's 4 Jaw Independent	dis 45
" Combination	dis 40
" Geared Scroll	dis 30
" 2 Jaw Brass Workers	dis 30
" Drill	dis 35
Wescott's Scroll Combination	dis 33⅓
" Independent	dis 40
" Little Giant Drill	dis 35
Horton's Universal	dis 40
" Independent	dis 45
Whiton's Independent	dis 45
National Combination	dis 40
Sweetland "	dis 40
Almond Drill	dis 20
Morse "	dis 15
Skinner's Combination Lathe	dis 40&10
" Independent Lathe	dis 40&10
" Universal Lathe	dis 40&10
" Drill	dis 20

Cutters and Reamers.

Cleveland	dis 10@15
Pratt & Whitney	dis 10@15
Standard	dis 10@15
Morse	dis 15
Brown & Sharpe, Milling Cutters	dis 15
" " Gear Cutters	dis 15

Crowbars.

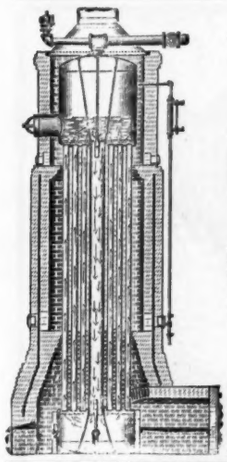
Cast Steel	℔ 3½
Iron, steel points	℔ lb 3

Drill and Drill Sockets.

Twist Drills	dis 50&10
Morse Taper and Straight Shank to 1½"	dis 50&10
Morse Taper and Straight Shank Larger than 1½"	dis 25
Drill Sockets	dis 25
Standard Twist Drills	dis 55@55&5
Cleveland " "	dis 55@55&5

Emery.

	No. 4 to No. 54 to Flour, C. F		
	46 gr.	150 gr.	F. FF.
Kegs, ℔	4½c	5 c	2½c
½ kegs ℔	4¾c	5¼c	2¾c
¼ kegs ℔	5 c	5½c	3 c
10 ℔ cans, 10 in case	6 c	6½c	5 c
10 ℔ cans less than 10	10 c	10 c	7½c



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SOLE BUILDERS OF THE

Cook Patent Water Tube Boiler

THE ONLY PERFECT WASTE-HEAT BOILER.

No incrustation.
Generates the greatest amount steam with least amount heat.
Repairs reduced to a minimum.
Can be used equally as well for direct firing or with natural gas.

WE ARE ALSO BUILDERS OF

HORIZONTAL, TUBULAR, AND FLUE BOILERS, OIL TANKS AND WATER STAND PIPES.

☞Estimates furnished promptly on receipt of specifications.

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MINING MINERAL AND TIMBER LANDS.

Municipal Bonds, Large Tracts of Florida
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Moffet Portable Drill

UNSURPASSED AS A REAMER.

Weighs 48 pounds and drills from ⅜ to 2 inches diameter.

Runs with Steam or Compressed air.
Will Work in Any Position.
An Economical Substitute for Rachet Drilling.
Send for Circular.

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WIRE ROPE
FOR ALL PURPOSES.
IRON AND STEEL WIRE OF ALL KINDS.
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NEW YORK OFFICE 17 BURLING SLIP
COOPER HEWITT & CO.
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WIRE ROPE — TRAMWAYS

EUREKA FENCE RATCHET.

SIMPLE, STRONG AND CONVENIENT TO HANDLE.

All parts held together by a pin inside of box; no losing of pawls or rollers. It can be adjusted quickly and be bought cheap. Both large and small sizes. Write for prices and terms. Address,

J. STAUFFER, 1630 East 3d St., Dayton, O.

Subscribe for the Iron Trade Review, $3 per year.

Emery Cloth and Paper.

Barder, Adamson & Co.....dis 50@50&5
H. H. Barton.....dis 50@50&5

Emery Wheels.

Detroit.....dis 55@60
Norton's.....dis 55@60
Grant.....dis 55@60
Sterling.....dis 60
Celluloid.....dis 10&33⅓
Northampton.....dis 55
Crystal.....dis 65@70
Vitrified.....dis 60
Vulcanite.....dis 60&10
Hamden.....dis 60&10@70
Cyclone.....dis 60@60&10

Files.

Arcade.....dis 60&10@60&10&10
Nicholson.....dis 60&10@60&10&10
" X. F.....dis 25
Kearney & Foot.....dis 60&10@60&10&10
Black Diamond.....dis 60&10@60&10&10
McClellan.....dis 60&10@60&10&10
Disston's.....dis 65@70
Western.....dis 70
Stub's.....dis 25
Grobet's.....dis 30
Reynolds Bros.' Hand Cut.....dis 50
Industry File Works Hand Cut.....dis 50

Hammers.

P. S. W.....dis 40
Atha new list, Jan. 15, 1887.....dis 50
Heavy hammers and sledges under 5 lbs.....15c
" " " over 5 lbs.....12c

Jack Screws.

Illinois Bolt Co. list.....dis 75

Nuts and Washers.

Size of bolt inches	¼	5-16	⅜	½	⅝	¾	1
Square	8	7	5½	4¼	4	3¼	3⅛
Hexagon	15½	11¼	8½	6	5¼	5¼	
Washers	9	8	7	5	4½	4⅛	4½

In lots less than 100 lbs, ₩ lb add ½c., 1 lb boxes add 1c to list.

Nails (wire).

List July 14, 1887.....dis 85
Standard Penny Nails, ₩ keg card rate
Car lots.....$1.20
Less than car lots...$1.35

Oilers.

Zinc and Tin.....dis 60
Brass and Copper.....dis 50
Malleable (Hammer's), No. 1, $3.60; No. 2, $4.00; No. 3, $4.40 ₩ doz.....dis 10@10&10

Packing, Steam.

Boston Belting Co.....dis 60
American Packing Hemp.....₩ lb 9@10
Russia " " .....₩ lb 14
Italian " " .....₩ lb 13@19
Plumbago Piston.....₩ lb 40
Peerless.....₩ lb 60
Morrison's " .....₩ lb 45
Square Flax " .....₩ lb 50
Sheet Rubber.....₩ lb 12&24
Excelsior Rubber.....₩ lb 48
Rainbow.....Full Rolls.....45c ₩ lb
Less than Full Rolls. 50c ₩ lb
Eclipse Gasket.....₩ lb 75

Picks.

Railroads, 5 to 6 lbs.....$12 dis 60
" 6 to 7 lbs.....$13 dis 60

Pulleys.

Iron Pulleys, Walker List.....dis 50
Medart Pulleys.....dis 50
Split Wood Pulleys.....dis 55@60

Rivets.

Iron, Thousand, list November 17.....dis 50&10@60
Iron, Ordinary, Cooper's Block and Carriage list November 17.....dis 50&10@60
Copper.....dis 50@50&10

Saws.

Disston's Circular.....dis 40&10
" Band.....dis 25
" Scroll.....Net
Hack Saw Stubs.....dis 20
" " Eureka.....dis 20
" " Star.....dis 20
Saw Swages Diston's.....dis 30
Atkins' Circular Saws.....dis 40&45
" Mill, Mulay and Drag Saws.....dis 40&10
" Wood Saws.....dis 40&10
" Silver Steel Diamond Cross-cut Saws.....70c per ft
" Dexter Cross-cuts.....50c "
" Diamond " .....30c "
" Tuttle Tooth Cross-cuts.....25c "
" One-man Cross-cuts.....12c "
No. 1 Handles.....23c per pair
No. 6 " .....16c "
Excelsior Saw Tools.....$6 per doz
Derfection " .....$15 "
Petroit Saw Works, Circular.....dis 50
" " " Band.....dis 25
" " " Mulay.....dis 45

Taps.

Cards, Hand and Nut to 2 in.....dis 50
Carpenters' " " " .....dis 50
Morse " " " .....dis 50
Pratt & Whitney " " new list.....dis 10
Machine Screw Taps.....dis 55
Pipe Taps to 2½ in.....dis 70
Stay Bolt Taps.....dis 25
Stove Bolt Taps.....dis 55
Pulley Taps.....dis 40

Vises.

Solid Box.....dis 60
Parker's.....dis 20@25
Prentiss.....dis 20
Stephen's.....dis 25@30
Barrett's.....dis 30
Miller's Falls.....dis 40
Merrill's.....dis 15@20
Howard.....dis 35

Wire.

New List, Jan. 18, 1884

Brass	dis 30
Copper	dis 40
Bright and annealed, Nos. 0@18	dis 70&10@75
" " Nos. 19@26	dis 75@75& 5
" " Nos. 27@36	dis 75&10& 5
Coppered Nos. 0 to 18, market list	dis 70@70& 5
Galvanized Nos. 0 to 18 " "	dis65& 5
Tinned market Nos. 0 to 18	dis 67½
Cast steel	dis 50
Tinned Broom Wire	dis 70&5@70&10
Annealed Fence, Nos. 8 and 9	dis 75
Annealed Grape, Nos. 10 to 14	dis 75
Stub's Steel Wire regular	.95c ₩ lb dis 30

Wrenches.

Coe's genuine	dis 50
Girard Standard	dis 70&10
Agricultural	dis 75&10
Mechanic's	dis 55&10& 5
Bemis & Call's Combination	dis 35
Donohue's Engineers	dis 20&10
Lamson & Sessions Engineers	dis 60
Billings & Spencer's Drop Forged	dis 25
William's " "	dis 25
Alligator " "	dis 40

Bolt and Nut Works.

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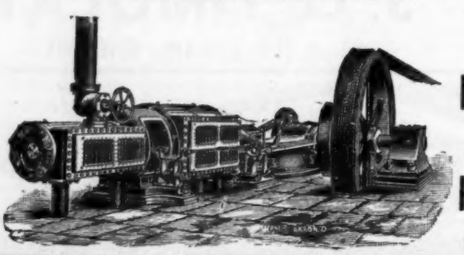

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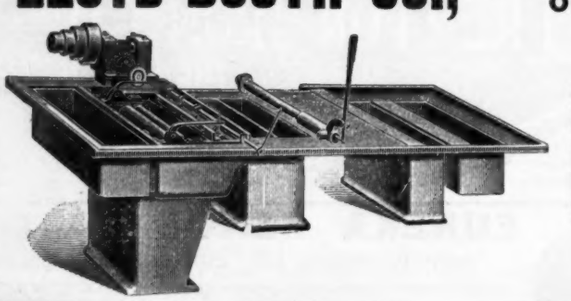

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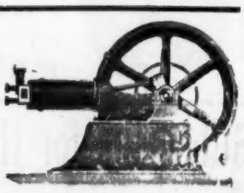

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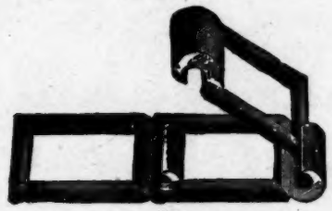

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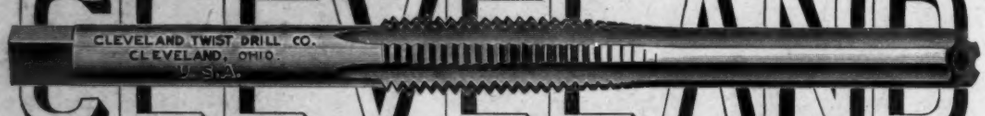

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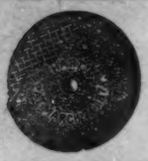

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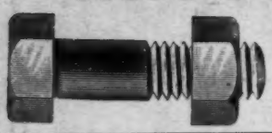

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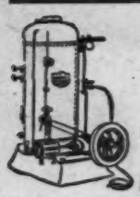

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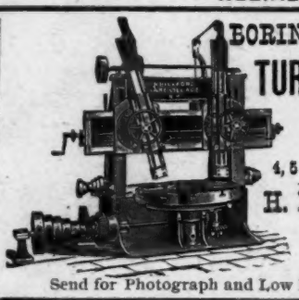

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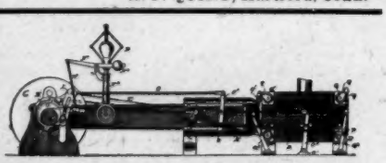

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